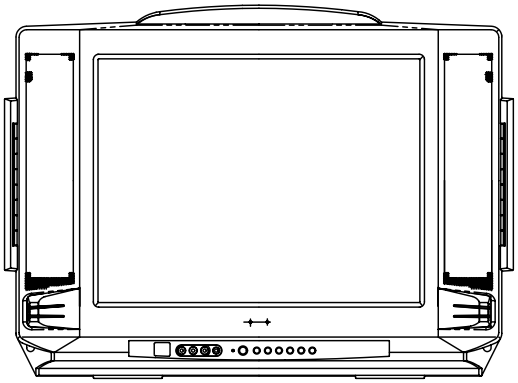
S/M No:CP490P-010

Service Manual

Colour Television

CHASSIS : CP-490

MODEL : DTR-14D3VG
DTR-14D3TM
DTR-16D3VG
DTR-20D3VG
DTR-20D3TM
DTR-21D3TMW
DTR-21D3VGW
DTR-21D3TGW



✔ Caution

: In this Manual, some parts can be changed for improving, their performance without notice in the parts list. So, if you need the latest parts information,please refer to PPL(Parts Price List) in Service Information Center (http://svc.dwe.co.kr).

DAEWOO ELECTRONICS CO., LTD.

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- **PRINTED CIRCUIT BOARDS**
- **SCHEMATIC DIAGRAM**

■ Specifications

VG : WITHOUT TXT. MODEL, TM : WITH TXT. MODEL

TV Standard	PAL/SECAM-B/G, D/K, I, H, NTSC-3.58/4.43
Mains Voltage	100~250V AC, 50/60Hz
Power Consumption	14”, 16” = 85W 20”, 21” = 90W
Sound output	-. 2 Speaker (at 80% MOD. 10% THD) : 5W + 5W (TWITTER 2.5W + 2.5W) →14”, 16” 6W + 6W (TWITTER 2.5W + 2.5W) →20” -. 3 Speaker (at 80% MOD. 10% THD) : 8W + 8W + 8W(21”)
Speaker	-. 2 Speaker : 7.5W, 8 OHM(2EA) -. 3 Speaker : 12W, 8 OHM(3EA)
Antenna Impedance	75 ohm unbalanced 300 ohm balanced with supplied balun
Tuning system	Voltage Synthesize Tuning System
Memory channel	100 channels
Reception channel Unit	VHF - L : CH2 - CH4 VHF - H : CH5 - CH12 Cable Band : CHS1’ - CHS3’, CHS1 - CHS20 UHF : CH21 - CH69
Remote control	VG : R-28B04, TM : R-28B03
Screen size	14” : 34cm (A34JLL 90×02) 20” : 48cm (A48JLL 90×02) 21” : 51cm (A51JLL 90×02)
Weight	14” : 9.7Kg(set) 20” : 19.6Kg(set) 21” : 26.5Kg(set)
Indication	On-Screen Display - MENU • Picture (Brightness, Color, Contrast, Sharpness, TINT) • TIMER (TM/TMW/TGW:CLOCK, OFF TIME, WAKE-UP-TIME, ACTIVATE, WAKE-UP-PROG/VG:CLOCK, ON TIME, OFF TIME) • LANGUAGE • PRESET • EDIT (TM, TMW, TGW) • SLEEP •BLUE BACK •GAME • AV1, AV2 •NORMAL1, NORMAL2, FAVORITE • SOUND MUTE • VOLUME CONTROL • WOOFER (21” ONLY) • 16:9, ZOOM, NORMAL

■ Safety Instruction

WARNING: Before servicing this chassis, read the "X-RAY RADIATION precaution", "safety precaution" and "product safety notice" below.

■ X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION.To avoid such hazards, the high voltage must not exceed the specified limit. The nominal value of the high voltage of this receiver is 23-24kv(14"), 26-27kv(20", 21") at max beam current. The high voltage must not, under any circumstances, exceed 27.5kv (14", 20"), 29.0kv(21").
   Each time a receiver requires servicing, the high voltage should be checked. It is recommended the reading of the high voltage recorded as a part of the service records. it is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY Radiation in this TV receiver is the picture tube. For continuous RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.

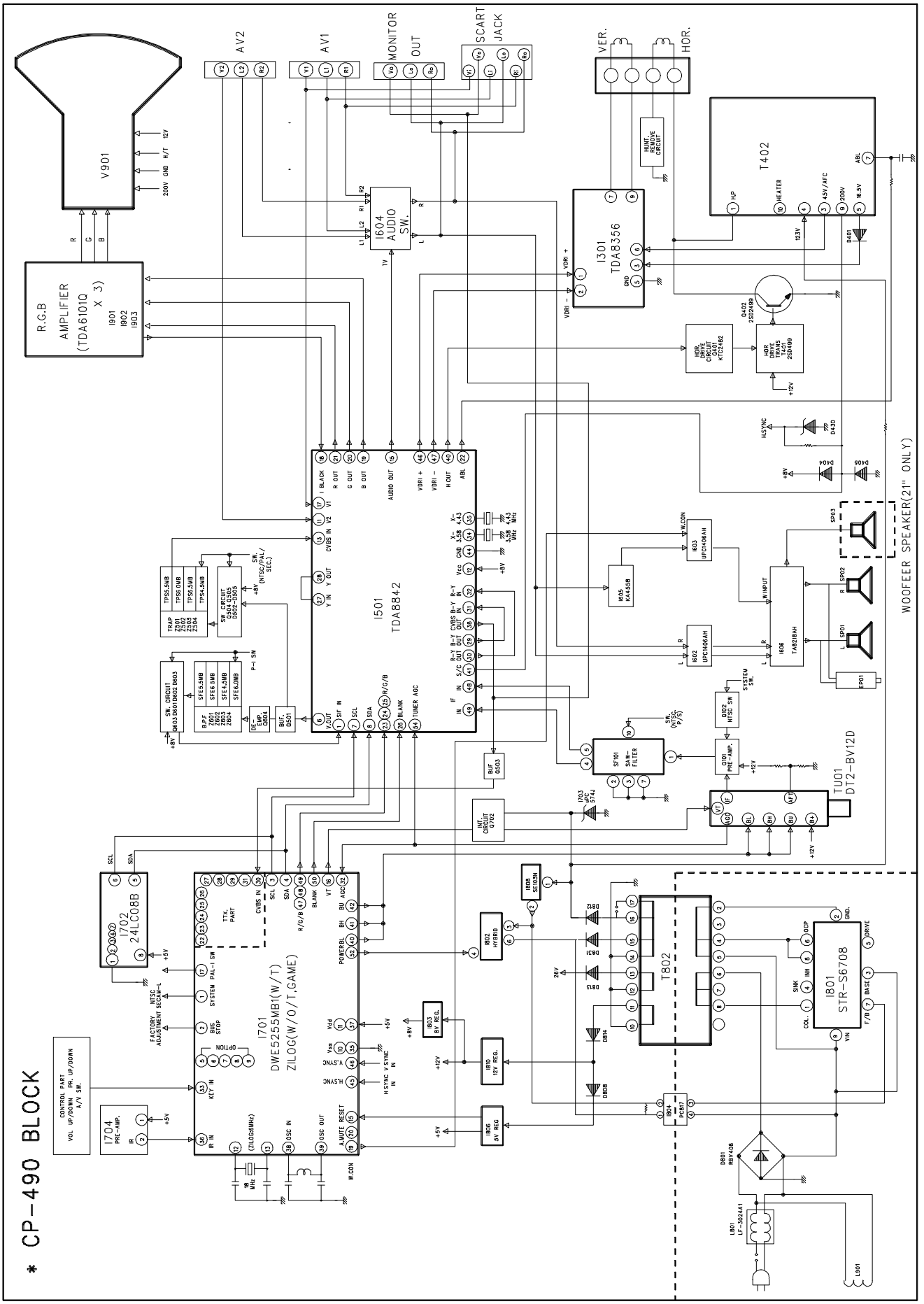
■ SAFETY PRECAUTION

1. Potentials of high voltage are present when this receiver is operating. Operation of the receiver outside the cabinet or with the back cover removed involves a shock hazard from the receiver.
   1) Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high-voltage equipment.
   2) Always discharge the picture tube to avoid the shock hazard before removing the anode cap.
   3) Discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the Replacement Parts List.
3. When replacing a high wattage resistor(oxide metal film resistor) in circuit board, keep the resistor 10mm away from circuit board.
4. Keep wires away from high voltage or high temperature components.
5. This receiver must operate under AC260 volts, 50Hz/60Hz. (AC 100~250 volts, 50/60Hz)NEVER connect to DC supply or any other power or frequency.

■ PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc.

■ Circuit Block Diagram



■ Alignment Instructions

1. AFT

1.1 Standard B/G,D/K,I

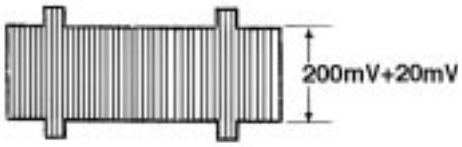
1) Set a Signal Generator with
   - RF FREQUENCY = 38.9 MHz,
   - RF OUTPUT LEVEL = 80 ±5 dBuV
   - System = PAL / SECAM - B/G, D/K, I
     NTSC - 3.58/4.43
2) Connect the Signal Generator RF Output to P101 (Tuner IF Output).
   There must be no signal input to the tuner.
3) Press the “AFT” KEY and wait until the TV screen display “AFT OK”.

2. AGC

1) Set a Pattern Generator with RF LEVEL 63° ±2 dBuV .
2) Connect a OSCILLOSCOPE PROBE to P102 (TUNER AGC INPUT).
3) Adjust AGC UP/DOWN KEY the voltage drop 2.0V±0.5V dc point its maximum voltage.

* Alternative Method

1) Set a Pattern Generator with
   - RF LEVEL 80 ±5 dBuV
   - PAL CROSSHATCH
   (without SOUND CARRIER)
2) Connect a OSCILLOSCOPE
   (Bandwidth ≥ 100MHz) PROBE
   to P101 (TUNER IF OUTPUT).
3) Use AGC UP/DOWN KEY to obtain
   an envelop amplitude 200 + 20 mVp-p.



3. SCREEN

1) Receive the color bar pattern and heat run over 15 minutes.
2) On the normal mode1 adjust the screen volume that the horizontal line appears on the screen after pushing the AFT-L key on the SVC remote control unit.
3) Adjust the screen volume that the horizontal lines reach the cut-off point

4. WHITE BALANCE

1) Set the TV to NOR I mode.
2) Set the R,G,B LEVEL to CENTER with R,G,B UP/DOWN KEY .
3) Adjust the R,G,B UP/DOWN KEY of the color which appears abnormally on the screen to obtain WHITE BALANCE.

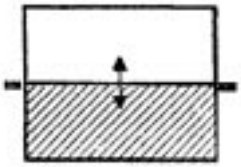
5. FOCUS

1) Apply a RETMA PATTERN signal.
2) Adjust the FOCUS VOLUME on FBT to obtain optimal resolution.

6. GEOMETRY

6.1 VERTICAL CENTER

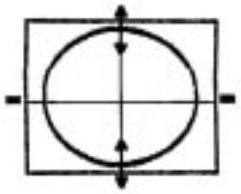
1) Set the TV to NOR I mode.
2) Pressing the V-SIZE UP/DOWN KEY, the lower half of the screen is blanked.
3) Adjust the border line of blanked picture coincident with the mechanical center marks of the CRT using the V-CENTER UP/DOWN KEY.



6.2 VERTICAL SIZE

* The VERTICAL CENTER adjustment has to be done in advance.

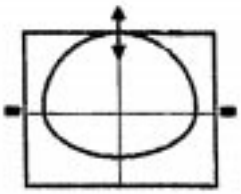
1) Apply a RETMA PATTERN signal.
2) Set the TV to NOR I mode.
3) Adjust the upper part of the picture with the V-SIZE UP/DOWN keys.



6.3 VERTICAL SLOPE

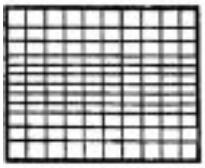
* The VERTICAL SIZE adjustment has to be done in advance.

1) Apply a RETMA PATTERN signal.
2) Adjust the lower part of the picture with the V-SLOPE UP/DOWN keys.



6.4 VERTICAL S-CORRECTION

1) Apply a CROSSHATCH PATTERN signal.
2) Adjust the S-COR UP/DOWN KEY to obtain the same distance between horizontal lines.



6.5 HORIZONTAL CENTER

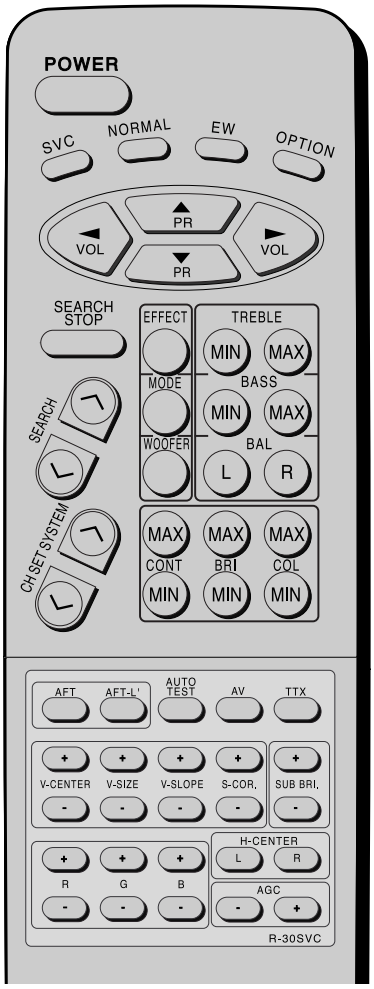
1) Apply a RETMA PATTERN signal.
2) Adjust picture centering with H-CENTER LEFT/RIGHT keys.

If EEPROM(I702) has been changed ;

- Option data has to be changed and
- all alignment function has to be readjusted.

* The initial state of adjustment are as follows;
  - V-Center, V-Slope V-Size, H-Center, R, G, B, AFT = Center (30/64 - 33/64)
  - S-Correction = 00/64
  - AGC = 15~60/64

*Service Remocon



■ IC Description

DW90244-AS/(Z8 DIGITAL TELEVISION CONTROLLER) = Z9024106PSC (ZILOG TYPE NO.)

(1) General Description

The Z9023X Digital Television Controller (DTC) family is ZILOG's latest and most powerful Z8-based DTC product offering, These parts feature larger system RAM and Rom Options, together with a host of new features including a newcolor palette systen, flexible inter-row spacing, higher character cell resolution, background mesh effect, dedicated I. R. capture registers, on-chip Analog-to-Digital conversion, and a hardware Master mode I^2C interface. The famililiar Z8 core in combination with these advanced features makes the Z9023X family an ideal choice for low to midrange televisions in both PAL and MTSC markets.

The Z9023X family consists of three basic device types; ICE Chip (Z90239), ROM Mask Parts (Z90233/Z90234), and OTP Part (Z90231), The OTP (Z90231) supports field programmable 32KB system ROM. ICE Chip (Z90239) is used in Z90239 Emulator and ProtoPaK. As described above, Z90233 supports 16KB system ROM and Z90234 supports 24KB system ROM for mask.

The Z9021X family takes full advantage of the Z8's expanded register file space to offer greater flexibility in On Screen Display creation.

(2) Feature

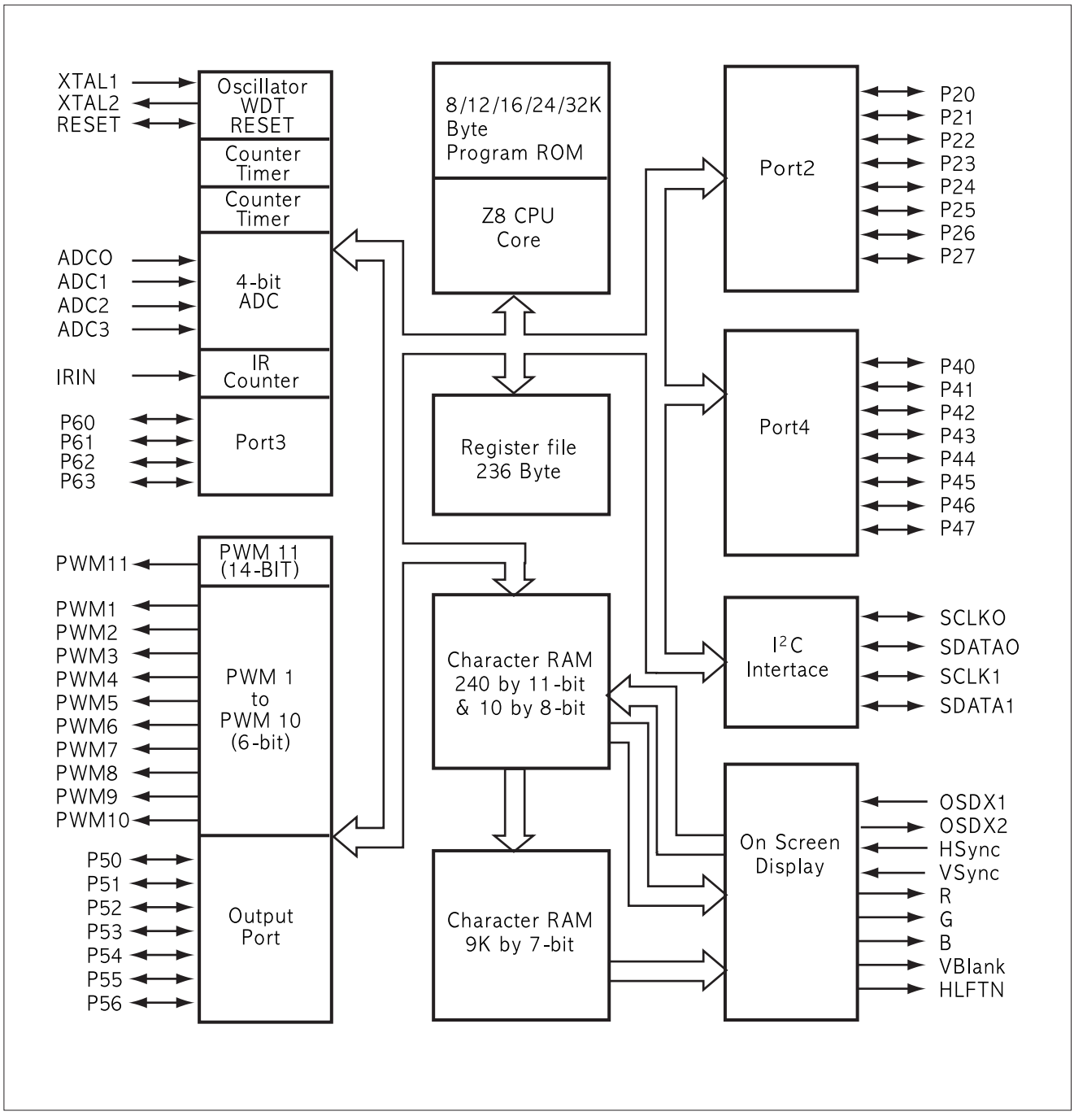
Z8-Based CMOS Microcontroller for Consumer Television, Cable Box, and Satellite Receiver Applications

- 42 - Pin SDIP Package except Z90239 (124 PGA)
- Z8@ MCU Core at 6 MHz
- Mask ROM sizes Available in 16 and 24KB
- Ten 6-bit Pulse Width Modulators
- One 14-bit Pulse Width Modulator
- On-Chip Infrared (IR) Capture Registers
- Four Channel 4-bit Analog-to-Digital Converter
- Twenty Seven General Purpose I/O Pins
- I^2C Master Serial Communication Port

On Screen Display (OSD) Section

- Supports Displays up to 10 rows by 24 Columns with 256 Characters
- Character Cell Resolution of 14 Pixels by 18 Scan lines
- Variable Inter-row Spacing from 0-15 Horizontal Scan Lines
- Foreground and Background Colors Fully Programmable by Character

(3) Block Diagram



(4) PIN CONFIGURATION(Z90241)

1	P40	P47/PWM10	42
2	P20	P46/PWM9	41
3	P21	F BLANK	40
4	P22	B	39
5	P23	G	38
6	P24(SCLØ)	R	37
7	P25(SDAØ)	V-SYNC	36
8	P26(SCL1)	H-SYNC	35
9	P27(SDA1)	P63	34
10	GND	P45/PWM8	33
11	VCC	P44/PWM7	32
12	X-TAL1	P43	31
13	X-TAL2	P42	30
14	P55/PWM6	OSD X2	29
15	RESET	OSD X1	28
16	P56/PWM6	VCC	27
17	P54/PWM5	IR IN	26
18	P53/PWM4	AGND	25
19	P52/PWM3	P62/ADCO	24
20	P51/PWM2	P61/ADC2	23
21	P50/PWM1	P60/ADC3	22

(5) PIN DESCRIPTION

Table 1. Z90231/233/234 42-Pin SDIP Package

Pin Number	Pin Function	I/O/PWR	Reset State	Name	Note
34	+5 Volts	PWR	PWR	Vdd	
30, 13	0 Volts	PWR	PWR	Vss, AVss	
36	Infra Red remote capture input	I	I	IRIN	
1	14-bit Pulse Width Modulator output	O	I	PWM11	1
20, 19, 18, 17, 2, 3, 4, 5, 6 ,7	6-bit Pulse Width Modulator output	O	I	PWM [10:1]	1
7, 6, 5, 4, 3, 2, 1	Bit programmable Input/Output ports	I/O	I	P5 [6:0]	
42, 41, 40, 39, 38, 37, 35, 21	Bit programmable Input/Output ports	I/O	I	P2 [7:0]	
21	Half tone output	O	I	HLFTN	
40, 42	I^2C Data	I/O	I	SDATA0, 1	
39, 41	I^2C Clock	I/O	I	SCLK0, 1	
16, 12, 10, 9	Bit programmable Input/Output ports	I/O	I	P6 [3:0]	
20, 19, 18, 17, 15, 14, 11, 8	Bit programmable Input/Output ports	I/O	I	P4 [4:0]	
31	Crystal oscillator Input	I	I	XTAL1	
32	Crystal oscillator output	O	O	XTAL2	
28	Dot clock oscillator Input	I	I	OSDX1	
29	Dot clock oscillator output	O	O	OSDX2	
26	Horizontal Sync	I	I	HSYNC	
27	Vertical Sync	I	I	VSYNC	
25	Video blank	O	O	CBLANK	
24, 23, 22	Video R, G, B	O	O	R, G, B	
9, 10, 11, 12	4-bit Analog to Digital converter input	AI	I	ADC[3:0]	
33	Device reset	I	I	/RESET	

NOTE : 1. It is input on POR. It must be configured to be output ports for PWM applications

DW5255MBI
(TVTEXT 8-bit Micro controller, Rom-version)
=SDA5254 (SIEMENS Type No.)

(1) General Description

The SDA 525x contains a slicer for TTX, VPS and WSS, an accelerating acquisition hardware modul, a display generator for “Level 1” TTX data and an 8 bit microcontroller running at 333 ns cycle time. The controller with dedicated hardware guarantees flexibility, does most of the internal processing of TTX acquisition, transfers data to/from the external memory interface and receives/transmits data via I^2C and UART user interfaces. The block diagram shows the internal organization of the SDA 525x. The Slicer combined with dedicated hardware stores TTX data in a VBI buffer of 1 Kbyte. The microcontroller firmware does the total acquisition task (hamming- and parity-checks, page search and evaluation of header control bits) once per field.

(2) Feature

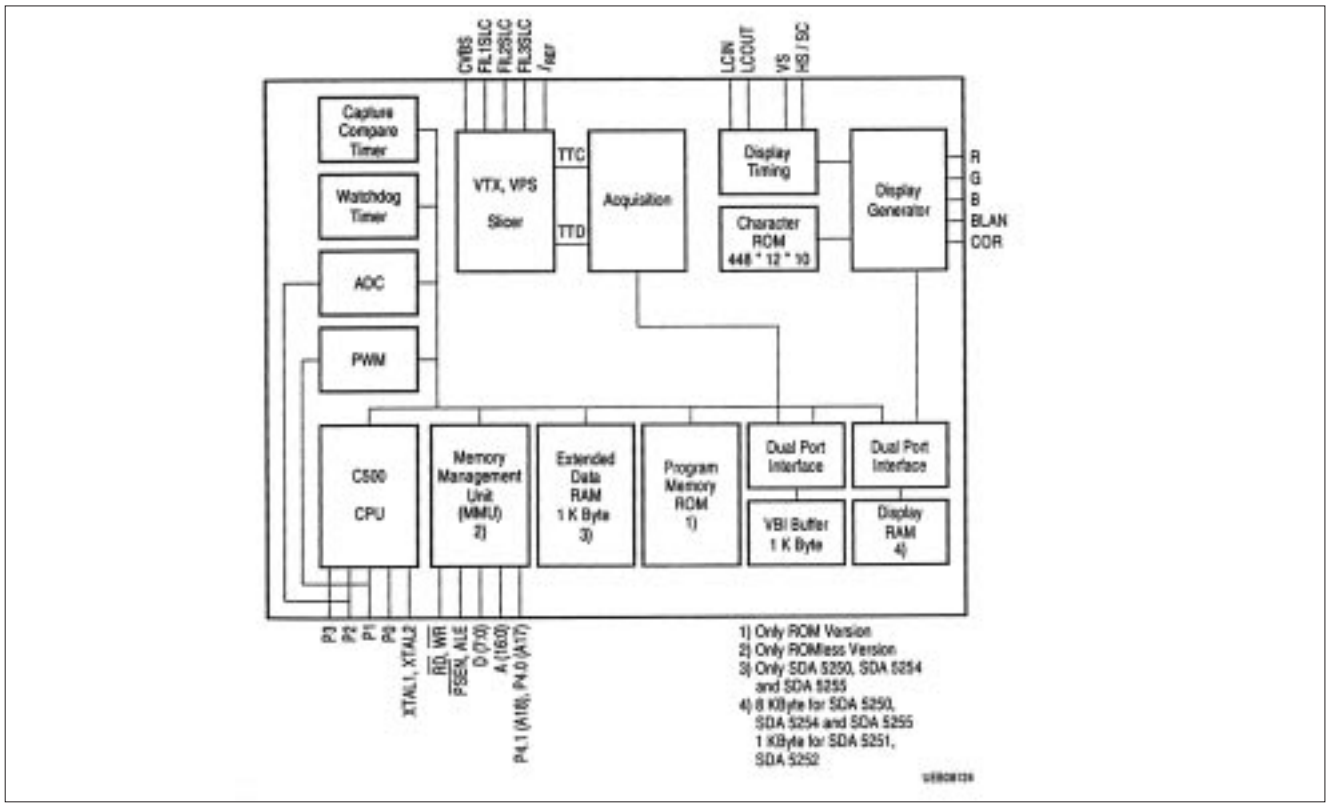
• **Acquisition**:
- Feature selection via special function register
- Simultaneous reception of TTX, VPS and WSS
- Fixed framing code for VPS and TTX
- Acquisition during VBI
- Direct access to VBI RAM buffer
- Acquisition of packets X/26, X/27, 8/30 (firmware)
- Assistance of all relevant checks (firmware)
- 1-bit framing code error tolerance (switchable)

• **Display:**
- Features selectable via special function register
- 50/60 Hz display
- Level 1 serial attribute display pages
- Blanking and contrast reduction output
- 8 direct addressable display pages for SDA 5250, SDA 5254 and SDA 5255
- 1 direct addressable display pages for SDA 5251 and SDA 5252
- 12 x 10 character matrix
- 96 character ROM (standard G0 character set)
- 143 national option characters for 11 languages
- 288 characters for X/26 display
- 64 block mosaic graphic characters
- 32 characters for OSD in expanded character ROM + 32 characters inside OSD box
- Conceal/reveal
- Transparent foreground/background - inside/outside of a box
- Contrast reduction inside/outside of a box
- Cursor (colour changes from foreground to background colour)
- Flash (flash rate 1s)
- Programmable horizontal and vertical sync delay
- Full screen background colour in outer screen
- Double size / double width / double height characters

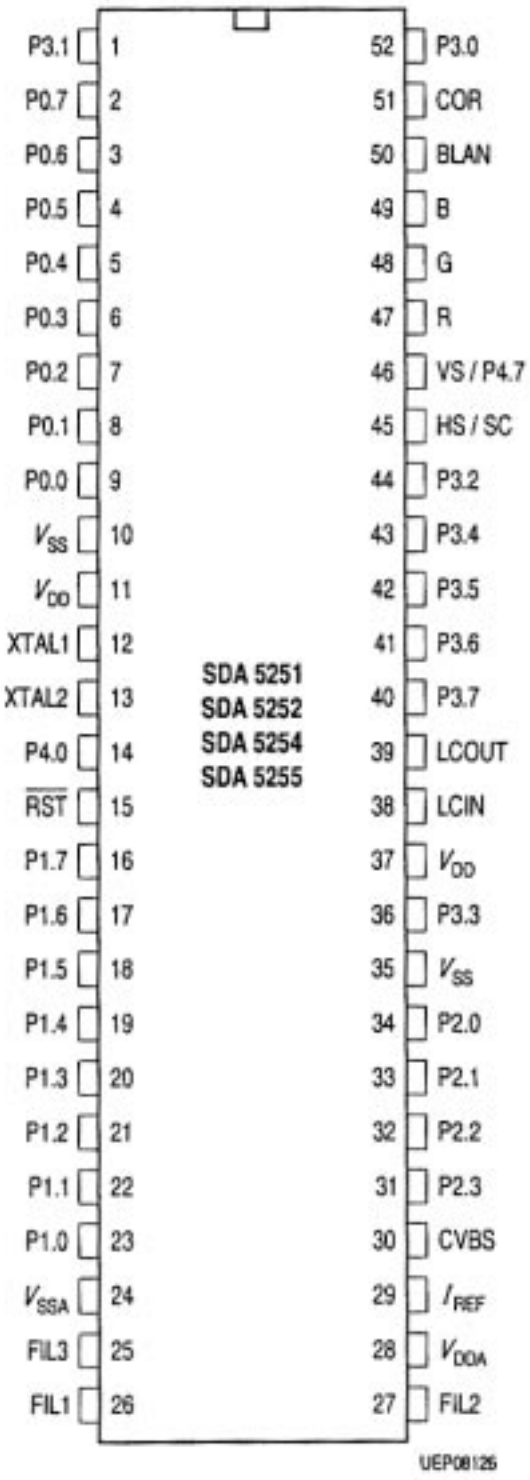
• **Synchronization**:
- Display synchronization to sandcastle or Horizontal Sync (HS) and Veritical Sync (VS) with start-stop-oscillator
- Independent clock systems for acquisition, display and controller

- **Microcontroller**
  - 8 bit C500-CPU (8051 compatible)
  - 18 MHz internal clock
  - 0.33 µs instruction cycle
  - Eight 16-bit data pointer registers (DPTR)
  - Two 16-bit timers
  - Watchdog timer
  - Capture comprare timer for infrared remote control decoding
  - Serial interface (UART)
  - 256 bytes on-chip RAM
  - 8 Kbyte on-chip on-chip display-RAM (access via MOVX) for SDA 5250, SDA 5254 and SDA 5252
  - 1 Kbyte on-chip display-RAM (access via MOVX) for SDA 5250, SDA 5254 and SDA 5255
  - 1 Kbyte on-chip TVT/VPS-Acquisition-buffer-RAM (access via MOVX)
  - 1 Kbyte on-chip extended-RAM (access via MOVX) for SDA 5250, SDA 5254 and SDA 5255
  - 6 channel 8-bit pulse width modulation unit
  - 2 channel 14-bit pulse width modulation unit
  - 4 multiplexed ADC inputs with 8-bit resolution
  - One 8-bit I/O port with open drain output and optional I^2C-Bus emulation (PORT 0)
  - Two 8-bit multifunctional I/O ports (PORT 1, PORT3)
  - One 4-bit port working as digital or analog inputs (PORT 2)
  - One 2-bit I/O port with optional function
  - One 3-bit I/O port with optional RAM/ROM address expansion up to 512 Kbyte (ROMless-Version)
- **P-SDIP-52-1 package or P-MQFP-64-1 for ROM-Versions (SDA 5251, SDA 5252, SDA 5254, SDA 5255)**
- **P-MQFP-80-1 Package for ROMless-Version (SDA 5250 M)**
- **P-LCC-84-2 Package for Emulator-Version (SDA 5250)**
- **5 V Supply Voltage**

(3) Block Diagram



(4) Pin Configuration P-SDIP-52-1 (ROM-Versions)



Pin Configuration P-SDIP-52-1 (ROM-Versions)
(top view)

24LC08B (EEPROM)

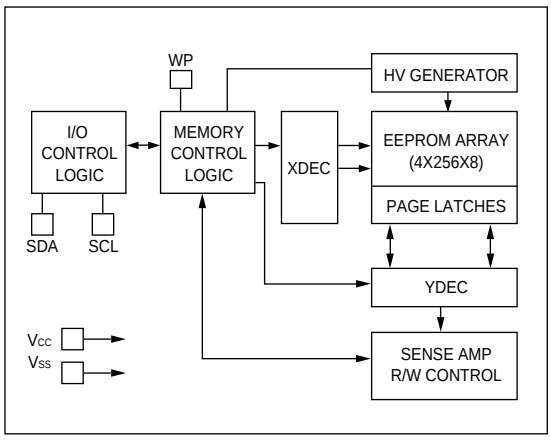
(1) Features

- Single supply with operation down to 2.5V
- Low power CMOS technology
  - 1mA active current typical
  - 10㎂ standby current typical at 5.5V
  - 5㎂ standby current typical at 3.0V
- Organized as two or four blocks of 256 bytes (2x256x8) and (4x256x8)
- Two wire serial interface bus, I²C™ compatible
- Schmitt trigger, filtered inputs for noise suppression
- Output slope control to eliminate ground bounce
- 100KHz(2.5V) and 400KHz(5V) compatibility
- Self-timed write cycle(including auto-erase)
- Page-write buffer for up to 16 bytes
- 2ms typical write cycle time for page-write
- Hardware write protect for entire memory
- Can be operated as a serial ROM
- Factory programming(QTP) available
- ESD protection > 4,000V
- 1,000,000 ERASE/WRITE cycles(typical)
- Data retention > 40 years
- 8-pin DIP, 8-lead or 14-lead SOIC packages
- Available for extended temperature ranges
  - Commercial : 0°C to +70°C
  -Industrial : -40°C to +85°C

(2) General Description

The Microchip Technology Inc. 24LC08B is a 8K-bit Electrically Erasable PROM.
The device is organized as four blocks of 256x9bit memory with a two wire serial interface. Low voltage design permits operation down to 2.5 volts with standby and active currents of only 5㎂ and 1mA respectively.
The 24LC08B also has a page-write capability for up to 16 bytes of data.
The 24L08B is available in the standard 8-pin DIP surface mount 80IC packages.

(3) Block Diagram



(4) Pin Description

PIN	SYMBOL	DESCRIPTION
1-3	A0, A1, A2	Device Address lnputs
4	Vss	Ground
5	SDA	Serial Data/Address
6	SCL	Serial Clock
7	WP	
8	Vcc	+5V Power supply

TDA884X (One Chip TV-processor)

(1) General Description

The TDA884X family is a pin-aligned range of single chip video and audio processors.

With this family it is possible to cover in one layout a whole range of applications from simple small screen single standard sets (as well PAL as NTSC with built-in delay line) to full multi-standard (including SECAM) 16:9 sets. Switching from the TDA837x family to TDA884X family has been made very easy:the SDIP packages of the families are almost pin aligned and minimal layout adaptations are necessary. Omitting the delay line TDA4665 and SECAM add-on TDA8395 with surrounding components, VCO coil, direct connection of U, V in-and outputs and adapting the software to access the 5 extra registers are the most relevant changes needed.

(2) Feature

- **IF**
  - Alignment free IF-PLL, IF frequency selection via I^2C (no external coil needed)
  - Vision IF amplifier with high sensitivity and good figures for differential phase and gain
  - PLL demodulator with high linearity offering the possibility for (single standard) intercarrier stereo audio application
  - Alignment PLL via I^2C
- **AUDIO**
  - Alignment free multi standard PLL audio demodulator (4.5 to 6.5 MHz.)
  - Volume control
- **Video**
  - Integrated fixed luminance delay line
  - Integrated chroma trap (auto calibrated)
  - Integrated chroma bandpass filters with switchable centre frequency (auto calibrated)
  - Asymmetrical peaking circuit in the luminance channel with switchable noise coring function
  - Black stretching of non standard CVBS or luminance signals, switchable via I^2C bus
- **RGB**
  - RGB control (brightness, contrast, saturation)
  - Improved black current stabilisation (continuos cathode calibration)
  - White point adjustment
  - Blue stretch which offsets colours near white to blue
  - Option to insert “blue back” when no video signal is available
- **Input / Output**
  - Flexible video source select with CVBS input for the internal signal and two external video inputs(one switchable for CVBS or Y/C).
  - The output signal of the video source select is externally available (also as CVBS when Y/C input is used).
  - External audio input.
  - Linear RGB input with fast blanking.
- **Synchronization and Deflection**
  - Horizontal synchronization with two control loops and alignment free horizontal oscillator.
  - Slow start and slow stop of the horizontal drive output to enable low stress start-up and switch-off from the line circuit at nominal line supply voltage.
  - Vertical count-down circuit for stable behavior with provisions for non-standard signals.
  - Vertical geometry control.
  - Vertical drive optimized for DC coupled vertical output stages.
  - Option for blanking of PAL plus helper signal
  - Option to stop the vertical deflection for Vg2 alignment
  - Option to switch-off in the vertical overscan
- **Control**
  - Full I^2C bus control, as well for customer controls as for factory alignment.

- All automatic controls have an option for forced mode.

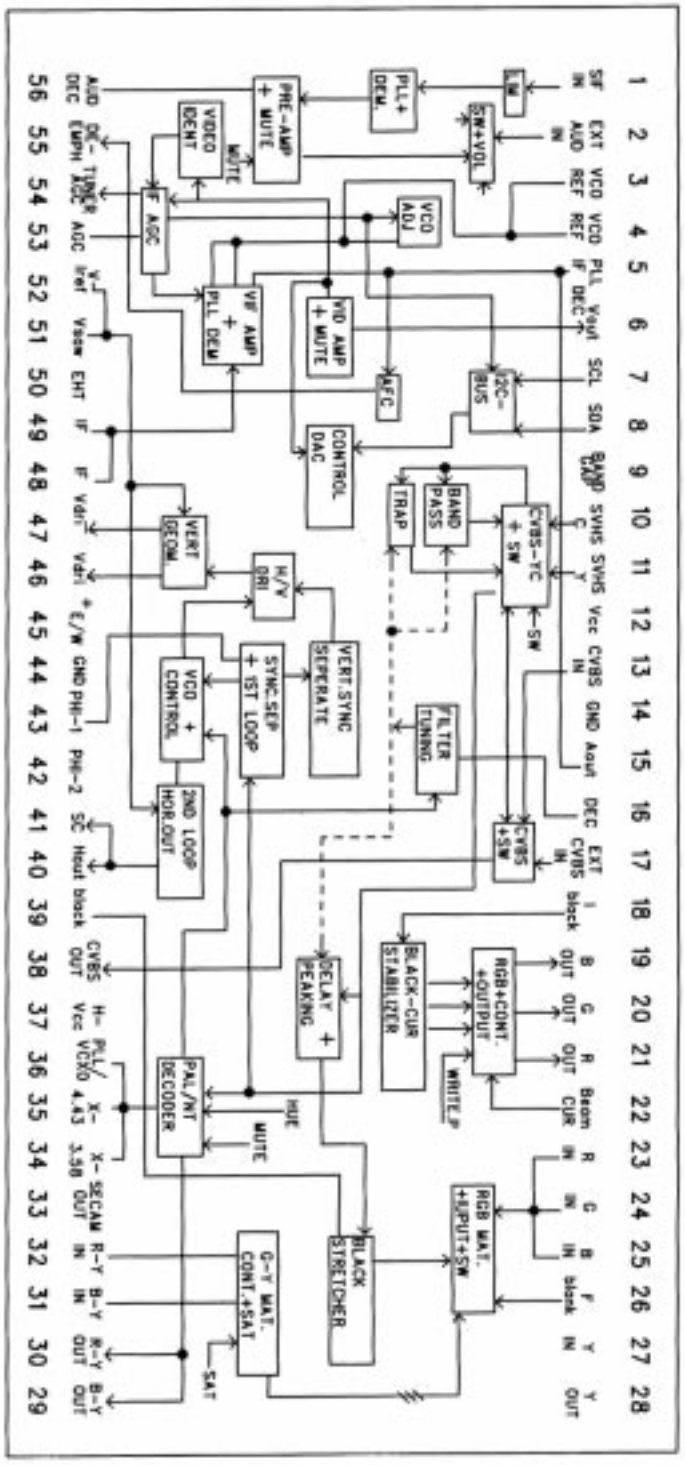
• **Power consumption**

- Low power consumption.

• **Packaging**

- SDIP-56 (Shrinked Dual In Line Package, 56 pins).

(3) Block Diagram



(4) Pin Description

No	Name	Description
1	SOUND IF INPUT	The sound equivalent input impedance is 8k5 ohm // 5pF which has to be taken into account for proper termination of the ceramic filters. The DC impedance is very high. The minimum input signal for catching is l mV rms.
2	EXT AUDIO INPUT	An external sound signal (500mVrms) for example from SCART can be applied to this pin via a coupling capacitor. The input has been made suitable to allow maximum 2Vrms. The input impedance is 25kohm.
3 4	VCO REF FILTER	The IF VCO tuned circuit is applied to these pin. Its resonance frequency must be two times the IF-frequency and in between a range of 64-120MHz. This range is suitable for the IF standards as 33.4, 38.9, 45.75 and 58.75MHz. The VCO frequency can be adjusted by I^2C bus so a fixed coil can be used.
5	PLL LOOP FILTER	Standard loopfilter is : R=390Ω and c=100nF in series to ground. The loopfilter band-width is 60kHz and is optimal for both fast catching and sufficient video suppression for optimal sound performance. The loopfilter time constant can be changed by I^2C bus function FFI (Fast filter IF-PlLL). When FFI=1, the PLL can better handle non-standard transmitter signals with large phase modulation. The standard PLL loopfilter value can be left unchanged. FFI=0 Normally selected or standard transmitter signals FFI=1 Specially to handle non-standard transmitter signals with large phase modulation. The function can be used for both positive and negative modulated signals
6	IF VIDEO OUTPUT	Although the video output impedance is low it is recommended to avoid high frequency current in the output due to for instance sound trap filters. This can be achieved by means of an emitter follower at the video output with a 1KΩ resistor in series with the base.
7	BUS INPUT : SCL	Serial clock line
8	BUS INPUT : SDA	Serial data line
9	BANDGAP DECOUPLING	The bandgap circuit provides a very stable and temperature independent reference voltage. This reference voltage (6.7V) ensures optimal performance of the TDA8842 and is used in almost all functional circuit blocks.
10	CHROMA INPUT	The supplied C S-VHS input burst amplitude should be nominally 300mV_{PP} (assumed is a colour bar signal with 75% saturation and with chroma/burst ratio of 2.2/1). The C S-VHS input is internally clamped to 4V via 50KΩ. The external AC coupling capacitor with 50KΩ forms a high pass filter. A recommended coupling capacitor is 1 nF; the high pass filter cut off frequency is then approximately 3KHz.
11	CVBS/Y INPUT	The CVBS/Y signal of 1Vpp (inclusive sync amplitude) is AC coupled to pin11.
12 37	SUPPLY	The TDA884X has two supply pins 12 and 37. Both pins must be supplied simultane ously. Notice that the IC has not been designed to use one of both pins as start pin.The nominal supply voltage is 8V with min/max values of 7.2-8.8V. The current consumption is about 60mA for each pin 12 and 37. In stand-by condition the 8V IC-supply can be switched off as to safe energy. After switching on the 8V again the normal start-up procedure must be followed. A voltage detection circuit is connected to both pins.

No	Name	Description
		Power-up : If the 8V increases >6.8V then; (after IC-initialization and auto re-calibration) Hout starts at 2fH Hout continues at fH Power-down : If the 8V drops <6.8V then; a power on reset, POR, is generate. The Hout is disabled immediately and RGB blanked IC must be re-initialized for correct re-start of the set
13 17	INT CVBS INPUT EXT CVBS INPUT	It is recommended that the CVBS1 int and CVBS2 ext input amplitudes are 1 Vpp (inclusive sync amplitude). This, because the noise detector switches the ø1 loop to slow mode (i.e. auto ø1mode when FOA, FOB = 0,0) when noise level exceeds 100mVrms (i.e. at S/N of 20dB).
14	GROUND	All internal circuits are connected to this ground pin 14.
15	AUDIO OUTPUT	The output signal is volume controlled and is active for both internal and external audio signals. The nominal gain is +9dB and -71dB, which gives a total control range of 80dB. The output signal range therefor is 0.14- 1400mVrms The bandwidth is >100kHz, the DC level is 3.3V and the output impedance is 250Ω.
16	DECOUPLING FILTER TUNING	Voltage variations at pin 16, which can be due to external leakage current or crosstalk from interference sources, should be less than 50mV to ensure that tuning of filters/delay cells remains correct.
18	BLACK CURRENT INPUT	For correct operation of the loop CURRENT information is supplied to the black current input pin.
19 20 21	BLUE OUTPUT GREEN OUTPUT RED OUTPUT	The RGB outputs are supplied to the video output stages from pins 21, 20 and 19 respectively. For nominal signals (i.e. CVBS/S-VHS, TXT inputs) and for nominal control settings, then the RGB output Signal amplitudes is typically 2VBLACK_WHITE.
22	V-GUARD INPUT/ BEAM CURRENT LIMITER	**Vertical Guard** The TDA835X vertical deflection IC's have a guard output which generates a pulse during every vertical retrace. This pulse can be monitored by the TDA884X. Whenever the height of this pulse is larger than 3.65V the vertical deflection IC's work correctly. The DC level during scan is not critical, but it should be below the 3.65V detection level. The vertical guard is controlled by the I^2C bits **EVG** and **NDF**. When **EVG** (Enable Vertical Guard) is set to 1, for **NDF** (No vertical Deflection) = 1 implies deflection failure. The RGB outputs are blanked when **NDF** = 1. **Beam current limiting** The beam current limiting function is realized by reducing the contrast followed by the brightness when the beam current reaches a too high level. The circuit can be divided into: - Peak white limiting (PWL): reacts internally on high local peaks in the RGB signal. - Average beam current limiting (ABL): reacts on the average picture content. it is an external function.
23 24 25	RED INPUT GREEN INPUT BLUE INPUT	The Rin, Gin, Bin input signals (nominal signal amplitude of 700mV) are AC coupled to pin 23, 24 and 25 respectively. Clamping action occurs during burstkey period.
26	RGB INSERTION SWITCH INPUT	The table below a survey is given of the three modes which can be selected with a voltage on RGB insertion switch input pin ; Vpin26 I^2C function Selected RGB signal 0.9V-3V IE1=0 RGB (internal) IE1=1 Rin,Gin,Bin (fast insertion on pin23,24,25) > 4V IE1=X OSD can be inserted at the RGBout pins

No	Name	Description
27 31 32	LUMINANCE in, B-Y / R-Y in	The Luminance out, B-Y / R-Y out signals from the output pins from the device itself or from YUV signal processing IC's MUST be DC coupled to the Luminance in, B-Y / R-Y inputs pin 27,31 and 32. Internally these pins are AC coupled to the input clamps. The clamping action is slow to ensure optimal clamping perormance for noisy YUV signals. In case YUV signal processing IC's are placed in the YUV path then be sure that the maximum voltage (DC-level and peak video level)does not exceed 5.5V. The TDA917X family IC's meet this requirement. When the output of a feature IC exceeds the maximum DC-level of 5.5V then level shifters must be placed at the inputs of the TDA884X. The Yin signal can be amplified, approximately 6dB, by means of the I^2C bit GAI in order to adapt to old feature IC's like the TDA4565. Because of the high input impedance outside burstkey clamping, it is advised to minimise the track length to the Luminance in, B-Y / R-Y in pins. Adequate ground shielding of these signal tracks is advised for good interference immunity. The TDA8840; TDA8841 and TDA8842 only have Luminance out, B-Y/R-Y out signals and these signals are internally connected to the Luminance in, B-Y/R-Y inputs. Also the GAI-bit is disabled in these types.
28 29 30	LUMINANCE in, B-Y / R-Y in	The luminace output signal is approximately $1V_{BLACK-WHITE}$ with typical output impedance of 250Ω. The colour difference output signals (B-Y / R-Y) have respectively a nominal output level $1.33V_{PP}$ and $1.05V_{PP}$, the output impedance of pins 29 and 30 is 500Ω when a colour system is identified. The Luminance out and B-Y/R-Y out signals can be connected to additional YUV signal processing IC's. How to connect these signals (AC or DC) depends on the input signals characteristic of signal processing IC, at which these output signals are connected to.
33	SUBCARRIER Reference output (Fsc)	The reference output can be used as a reference for comb filter applications. For PCB layout considerations, a short signal track connection with interface devices is advised. It is advised to minimise parasitic capacitance of pin to ground (i. e. avoid large ground planes around signal track). The parasitic capacitance at this pin to ground should be less than 10_PF.
34 35	X-TAL 3.58 X-TAL 4.43	To ensure correct operation of both: - colour processing internal circuits, - sync calibration internal circuits, it is only allowed to have 3.6MHz Xtals on pin34: both 4.4MHz,3.6MHz Xtals are allowed on pin 35. If pin 35 is not used: then it is left open in application (also XA,XB=O,1).
36	LOOP FILTER PHASE DETECTOR	One of the important aspects of the PLL is the loop filter connected to pin 36; it influences the dynamic performance of the loop.
38	CVBS1 OUT	The output amplitude is 2Vpp (transfer gain ratio between $CVBS_{INT}$ or $CVBS_{EXT}$ or CVBS/Y and $CVBS1_{OUT}$ is 2). The maximum output impedance is 250 Ω. For application with the SAA4961 combfilter, 6dB attenuation is required. It is advised to use an emitter follower circuit as shown in Fig 35. For scart application the same emitter follower can be used. It is advised that the signal paths to the comb filter and back to the TDA8842 are as short as possible so as to avoid crosstalk from interference sources. The follower is placed as close as possible to pin 38.
39	BLACK PEAK HOLD CAPACITOR	For the correct working of the black stretcher an external time constant should be added at the black peak hold capacitor input.
40	HOR OUTPUT	This open collector output is meant to drive the horizontal output stage. The output is active low, i.e. the line transistor should conduct during the low period of the output.
41	SANDCASTLE OUTPUT/ FLYBACK INPUT	Pin 41 is a combined input/output pin. The pin provides a three level sandcastle pulse. Both burstkey pulse and vertical blanking pulse are always available, the line

No	Name	Description
		blanking pulse is only present when the external flyback pulse is fed to this pin.The line flyback pulse, fed to this pin is used for two functions: - input signal for the PHI-2 1oop and - RGB line blanking. (without flyback pulse blanking occurs only during the burstkey pulse) Because of the combined input/output function, the connected circuit should be carefully designed for optimal performance. **Flyback pulse** The selection of the flyback pulse is important. Please note that the flyback pulse width may not vary on beam current variations because they can not be compensated by the PHI-2loop.
42	PHI-2 control loop	**Loopfilter:** The loopfilter is a first order filter. This pin requires a capacitor(C) only. The recommended value is 4.7nF. The minimal value for C = 1nF. The loopgain than is reduced to 0dB for 3kHz. A value up to 10nF is allowed but makes the loop slower. To avoid disturbances in the loop the capacitor should be connected to the TDA884X ground pin as short as possible. **Loopgain:** The static loopgain (K) is 120µs/µs. This implies that phase variations (δt_0) due to storage time variations (δt_d)are reduced by this factor of 120. This is valid when only a capacitor is connected to the PHI-2 pin. Any resistor connected externally reduces the loopgain. For R = 10MΩ -> K = 60, and for R = 1MΩ -> K = 12. **Shift control range:** The picture can be centered on screen by means of the horizontal shift (HS) via I2C bus. The range is +/-2µs. The delay between the positive going Hout (line transistor switches off then) and start burstkey pulse (ref PHI-2) must be ≤17µs. **Flash protection:** A flash protection becomes active when this pin is forced >6V. The horizontal drive is switched-off immediately. Once the voltage is <6V the horizontal drive is switched-on again via the slow start procedure. A series resistor of 1kΩ is required for current limitation. See also XPR function for overvoltage protection. **PHI-2 switched off:** The PHI-2 loop is switched off when the PHI-2 pin is forced externally to 1V. This is for analysis purpose only.
43	PHI-1 control loop	The loopfilter connected to pin 43 is suitable for various signal conditions as strong/weak and VCR signal. This is achieved by switching of the loopfilter time constant by changing the PHI-1 output current. Via I^2C bus FOA/B, different time constants can be chosen, including an automatic mode which gives optimal performance under varying conditions.
44	GROUND	To this pin are connected the IC-substrate and horizontal output.
45	AVL output	The AVL capacitor is connected to pin 45. The recommended capacitor value is 1 to 4.7µF; it's optimal value is a compromise between fast volume settling, AVL hold time (dynamic sound range) and harmonic distortion. - small AVL capacitor: gives fast volume settling but reduces the dynamic sound range and performance on harmonic distortion for mainly low audio frequencies - large AVL capacitor value gives maximal AVL performance but increases the volume settling time. The active control range for pin 45 is 1V for maximum gain and 5 V for minimal gain. During channel switching it's recommended to force a sound mute (make SM=1). The AVL then can't be disturbed by noise peaks during channel setting; this ensures a fast setting of the volume level.

No	Name	Description
46 47	VERT DRIVE + VERT DRIVE -	The vertical drive has a current output. The output is balanced which ensures a good common mode behavior with temperature and makes the output signal less sensitive for disturbances.
48 49	IF INPUT	The PLL frequency range is 32-60MHz with corresponding VCO frequency 64-120MHz. The IF input impedances is 2KΩ⁄ in parallel with 3pF and matches the required load for commonly used SAW filters. A DC coupling is allowed, so no series capacitors between SAW filter and IF input are necessary.
50	EHT/OVERVOLTAGE PROTECT INPUT ZOOM FUNCTION	The input range for EHT tracking is 1.2V - 2.8V, for a compensation of +/-5% on vertical and / or EW. The tracking on EW can be switched on/off by HCO. The nominal voltage of pin 50 for no compensation is 2V. The EHT feedback signal must be filtered in order to prevent disturbances in vertical and/or EW deflection. A compromise has to be determined for tracking speed on normal EHT variation and ripple immunity. Special linear zoom facilities on both Vertical and East-West gives the possibility to adapt the picture size for both 16:9 and 4:3 screens. When zoom is used, the geometry correction remains correct in both vertical and horizontal direction. Using VSC(Vertical Scroll) the (expanded) picture can be shifted up and down. By programming the vertical slope, VS, subtitles at the bottom part of the picture can be made visible while the picture position at the top of the screen remains fixed (subtitle mode).
51	VERTICAL SAWTOOTH CAPACITOR	This pin requires a capacitor to ground of l00nF +, - 5%. Short connection to the ground pin of the TDA884X is required. **Important:** For this capacitor, a type with good tem perature behaviour, long term stability and low leakage must be chosen. Change of the capacitance value due to temperature and/or aging leads to a proportional change in vertical amplitude. Tolerance of the external capacitor can be compensated by means of the vertical slope adjustment of I²C bus function **VS**. The charge current can be fine tuned with =/- 20%. The optimal sawtooth amplitude is 2.9V and is determined by the external capacitor and charge current. For R = 39KΩ at pin 52, the vertical slope VS = 1F and field frequency = 50Hz, the charge current is 16µA. For 60Hz the charge current is increased by 20%. The sawtooth bottom-level is 2.3V. The vertical retrace time is determined by the discharge current of 1mA and lasts about 5 horizontal lines.
52	REFERENCE CURRENT INPUT	This pin requires a resistor to ground. The optimal reference current is 100µA. which is determined by this resistor.
53	AGC DECOUPLING CAPACITOR	The AGC capacitor value is 2.2µF and has been defined for an optimal compromise between AGC speed and tilt for all AGC modes (negative/positive modulation).
54	TUNER AGC OUTPUT	This output is used to control (reduce) the tuner gain for strong RF signals. The tuner AGC is an open collector output which is acting as a variable current source to ground.
55	AUDIO DEEMPHASSIS	The pin requires a capacitor to ground that defines the deemphasis time constant. The DC and mute level is 3V. The signal is internally connected through to the Audio switch.
56	DECOUPLING SOUND DEMODULATOR	This pin requires a capacitor of 10µF connected to ground. The pin acts as a low pass filter needed for the DC feedback loop.

TDA6106Q (Video Output Amplifier)

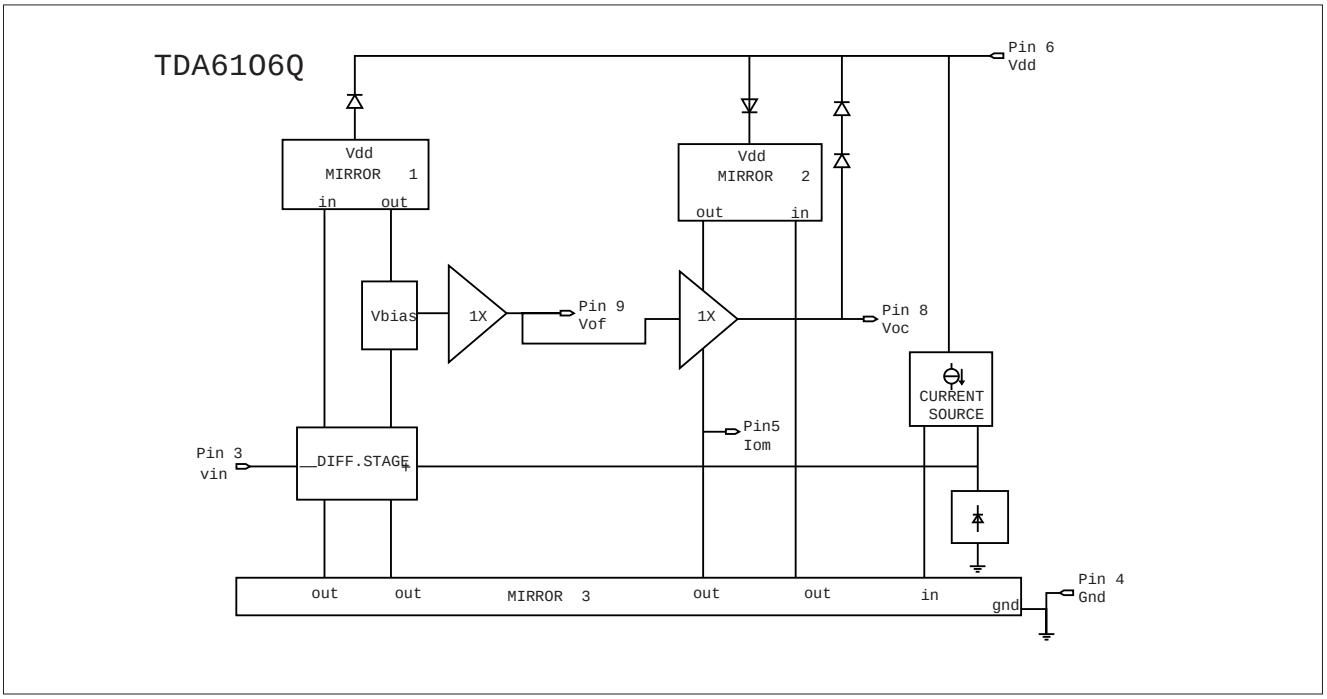
(1) General Description

The TDA6106Q is a monolithic video output amplifier (5MHz bandwidth) in a SIL 9 MPpackage, using high-voltage DMOS technology, and is intended to drive the cathode of CRT directly .
To obtain maximum performance, the amplifier should be used with black-current control.

(2) Feature

- Black - current measurement output for automatic black current stabilization (ABS)
- Single supply voltage of 200V
- Internal protection against positive appearing CRT flash-over discharge
- Protection against ESD
- Internal 2.5V reference circuit
- Controllable switch-off behavior

(3) Block Diagram



(4) Pin Description

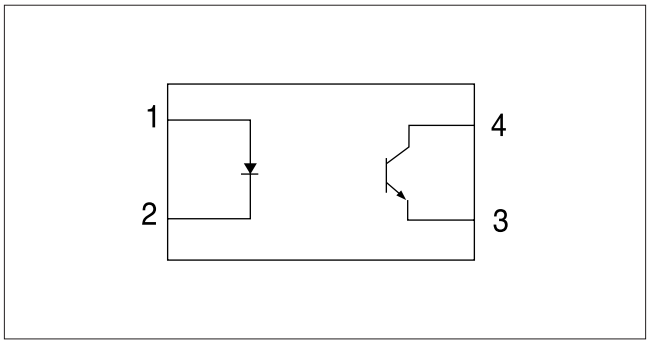
PIN	SYMBOL	DESCRIPTION
1		N.C
2		N.C
3	V in	inverting input
4	GND	ground, substrate
5	I om	Black-current measurement output
6	V dd	supply voltage high
7		N.C
8	V oc	cathode output
9	V of	feedback/transient output

I804 PC817

(1) General Description

The specification applies to the structures and characteristics of Model No. PC817

(2) Block Diagram



(3) Absolute maximum ratings

	Parameter	Symbol	Rating	Unit
Input	Forward current	IF	50	mA
	*1) Peak forward current	IFM	1	A
	Reverse voltage	VR	6	V
	Power dissipation	P	70	mW
Output	Collector-emitter voltage	VCEO	35	V
	Emitter-collector voltage	VECO	6	V
	Collector current	IC	50	mA
	Collector power dissipation	Pc	150	mW
Total Power dissipation		Ptot	200	mW
Operating temperature		Topr	-30~+100	˚C
Storage temperature		Tstg	-55~+125	˚C
*2) Isolation voltage		Viso	5	kVrms
*3) Soldering temperature		Tsol	260	˚C

*1) Pulse width ≤100㎲s, duty ratio: 0.001

*2) AC for 1 minute, 40~60% RH

*3) For 10 seconds.

TDA8356 (DC-coupled vertical deflection circuit)

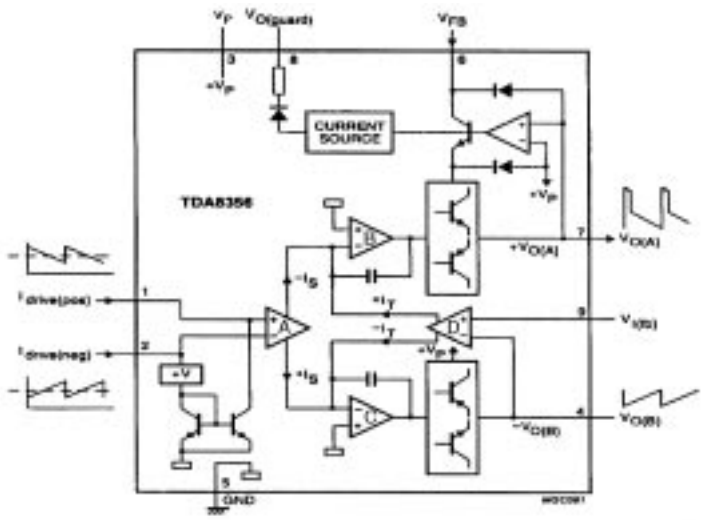
(1) General Description

The TDA8356 is power circuit for use in 90° and 110° color deflection systems for field frequencies of 50 to 120 Hz. The circuit provides a DC driven vertical deflection output circuit, operating as a high efficient class G system.

(2) Feature

- High efficient fully DC-coupled vertical output bridge circuit
- Vertical fly-back switch
- Guard circuit
- Protection against : - short circuit of the output pins (7 and 4)
  - short circuit of the output pins to Vp
- Temperature (thermal) protection
- High EMC immunity because of common mode inputs

(3) Block Diagram



(4) MAXIMUM RATINGS (Ta=25°C)

PIN	SYMBOL	DESCRIPTION
1	I drive (pos)	input power stage (positive); include Ii(sb) signal bias
2	I drive (neg)	input power stage (negative); include Ii(sb) signal bias
3	V p	operating supply voltage
4	V o(b)	output voltage B
5	GND	ground
6	V fb	input fly-back supply voltage
7	V o(a)	output voltage A
8	V o(guard)	guard output voltage
9	V I(fb)	input feedback voltage

TA8218AH (AUDIO IC AMP) : 3 SPEAKER MODEL (CONTAINS WOOFER)

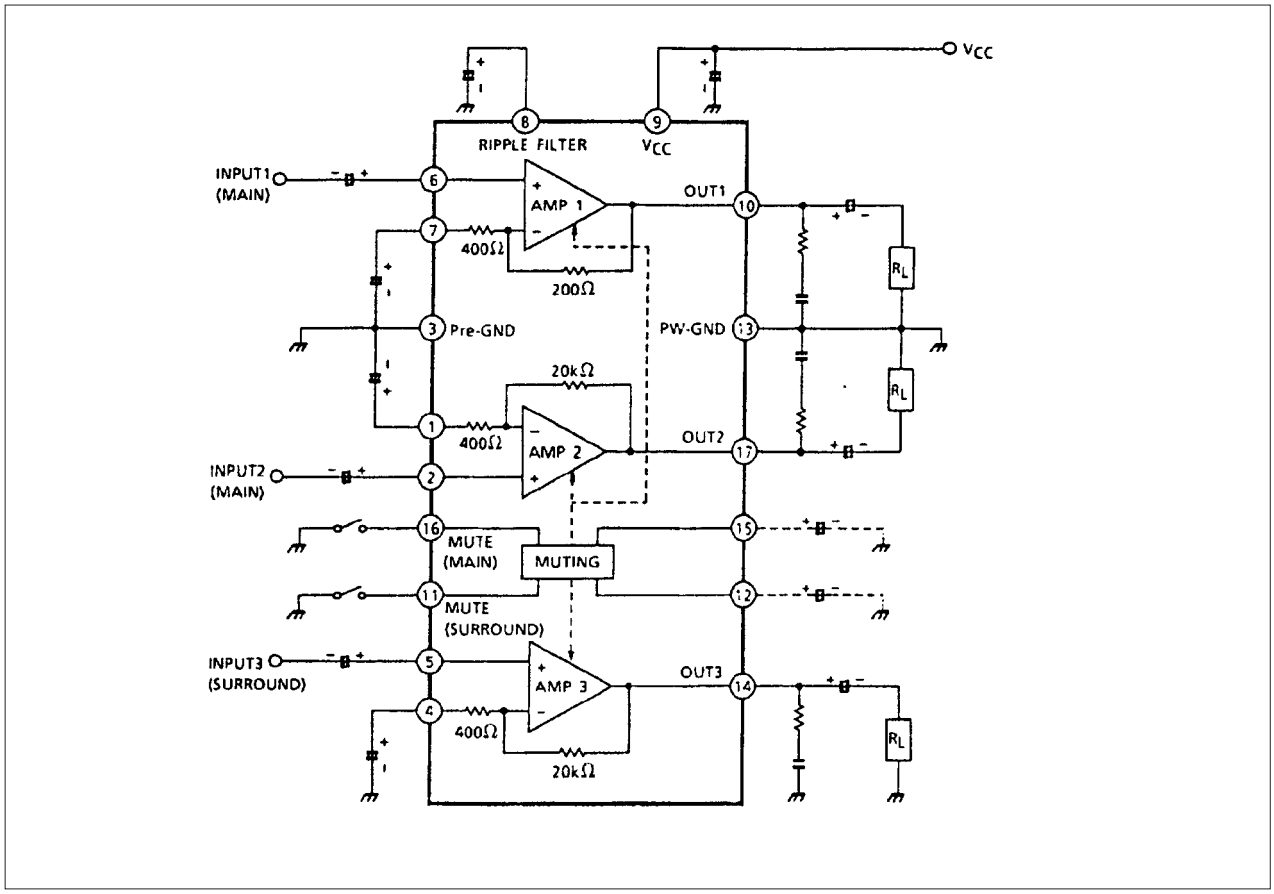
(1) General Description

The TA8218AH is 3 channel audio amplifier for consumer applications.
This IC provides an output power of 6 watts per channel.(at Vcc=20V, f=1kHz, THD=10%, R_L=8Ω) It is suitable for power amplifier of TV and Home stereo.

(2) Features

- Built-in 3ch amplifier
- High Output power : Pout=6W/ch(Typ.)
  (Vcc=20V, R_L=8Ω, f=1kHz, THD=10%)
- Low Noise : Vno=0.14mVrms(Typ.)
  (Vcc=20V, R_L=8Ω, Gv=34dB, Rg=10kΩ, BW=20Hz~20kHz)
- Built in Audio Muting Circuit (Active → Low)
  Main Amp/Surround Amp independent Control.
- Built in Various protection Circuits
  Protection Circuit : Thermal Shut Down, Over Voltage, Out → GND short.
- Operation Supply Voltage Range : Vcc(opr) = 10 ~ 30V(Ta=25˚C)

(3) Block Diagram



(4) MAXIMUM RATINGS (Ta = 25˚C)

CHARACYERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	VCC	30	V
Output Current (Peak/ch)	IO(peak)	2.0	A
Power Dissipation	Pd	50	W
Operating Temperature	Topr	-20~75	˚C
Storage Temperature	Tstg	-55~150	˚C

Note: Derated above Ta=25˚C in the proportion of 400mW/˚C

(5) Electrical Characteristics

Unless otherise specified, Vcc = 20V, R_L = 8Ω, Rg = 600Ω, f = 1 KHz, Ta = 25˚C

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.L	MAX.	UNIT
Quescent Current	ICCQ	–	Vin=0	40	90	160	mA
Output Power	Pout(1) Pout(2)	– –	THD=10% THD=1%	5.0 –	6.0 4.5	– –	W
Total Harmonic Distortion	THD	–	Pout=2W	–	0.1	0.6	%
Voltage Gaim	Gv	–	Vout=0.775Vrms (0dBm)	32.5	34.0	35.5	dB
Input Resistance	R_{IN}	–	–	–	30	–	kΩ
Ripple Rejection Ratio	R.R.	–	Rg=0, fripple=100Hz Vripple=0dBm	-50	-60	–	dB
Output Noise Voltage	Vno	–	Rg=10kΩ BW=20Hz~20kHz	–	0.14	0.3	mVrms
Cross Talk	C.T.	–	Rg=0 Vout=0.775Vrms(0dBm) Two channels input	–	-60	–	dB
Muting Threshold	$V_{TH(OFF)}$	–	Mute ON ⑪/⑯ pin	–	3.7	4.0	V
	$V_{TH(ON)}$	–	Mute OFF ⑪/⑯ Pin	2.5	2.8	–	
Muting Attenuation	ATT	–	Vout=0.775Vrms → Mute Three channels input	-52	-60	–	dB

UPC1406HA(Audio output Amplifier)

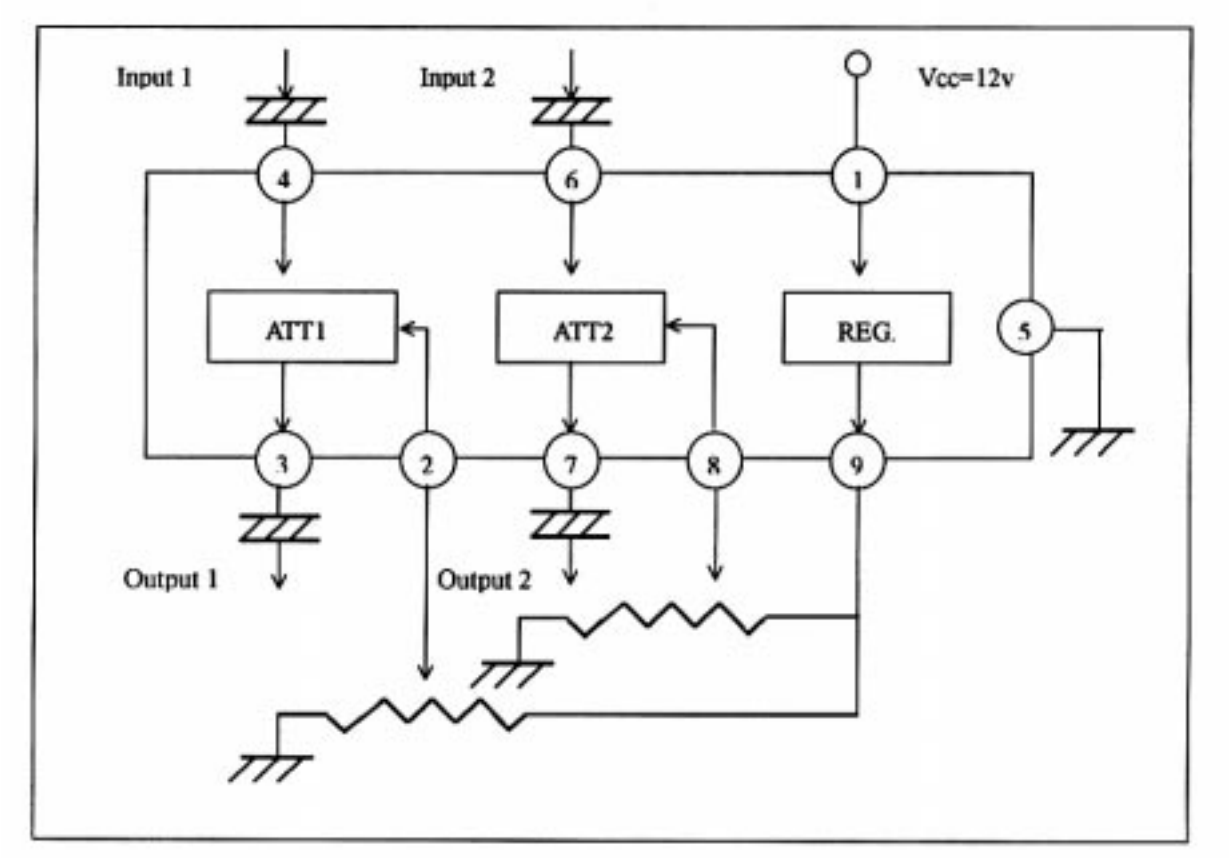
(1) Feature

- Each attenuator is completely separate and is very easy to control with remote control (e.g Volume, Balance)
- This IC's characteristic control curve is linear against logarithmic output and offers smooth control.
- Channel Seperation : 64dB MIN
- Typical Application : Sound MPX attenuator for TV, Radio and mobil receiver

(2) General Description

- The UPC1406HA is a silicon monolithic integrated circuit for sound control (e, g, Volume, Balance)
  This IC has a good characteristic control curve ('A' Cuve) and is very suitable for remote control applications.
  The two attenuators are completely separate and is easy to control the balance between the two attenuators.
  This IC is manufactured in a 9 pin slim SIP.

(3) Block Diagram



KA4558H/A/I

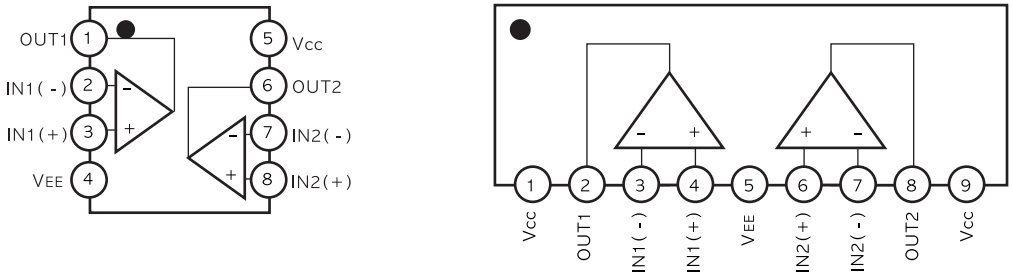
(1) General Description

The KA4558 series is a monolithic integrated circuit designed for dual operational amplifier.

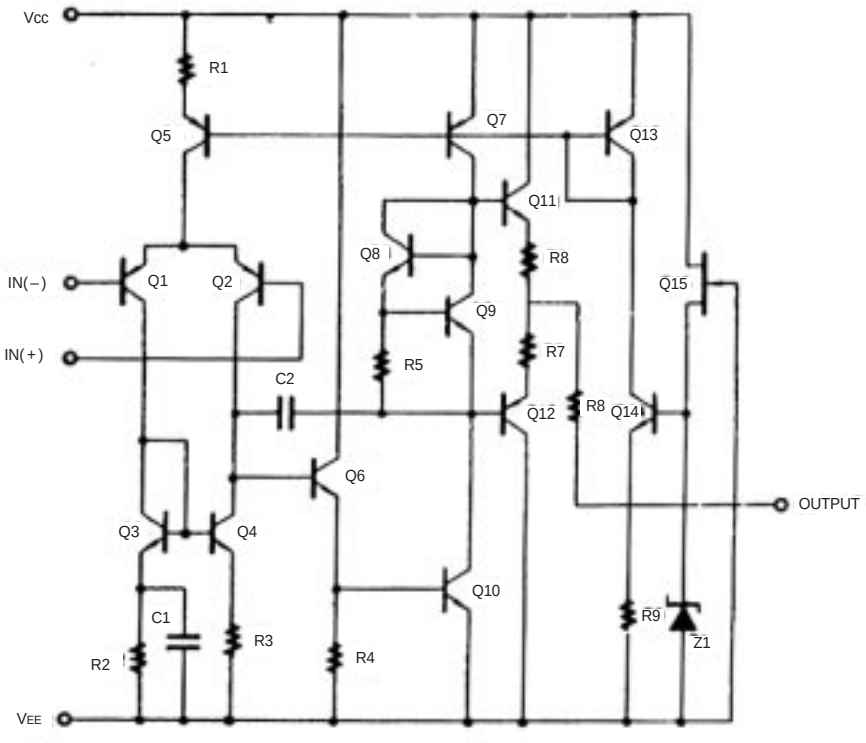
(2) Features

- No frequency compensation reguired.
- No latch-up.
- Large common mode and differential voltage range.
- Gain and phase match between amplifiers.
- Internally frequency compensated.
- Low noise input transistors.

(3)Block Diagram



(4) SCHEMATIC DIAGRAM (One Section Only)



(5) ABSOLUTE MAXIMUM RATINGS

CHARACYERISTIC	SYMBOL	RATING	UNIT
Supply Voltage (KA4558A/AI) (KA4558/I)	VCC	± 22 ± 18	V V
Differential Input Voltage	$V_{I(DIFF)}$	± 30	V
Input Voltage	V_I	± 15	V
Power Dissipation	P_D	400	mW
Operating Temperature Range (KA4558I/AI) (KA4558/KA4558A)	T_{OPR}	-40 ~ +85 0 ~ +70	˚C ˚C
Storage Temperature Range	T_{STG}	-65 ~ +150	˚C

(6) ELECTRICAL CHARACTERISTICS

(V_{CC}=15V, V_{EE}=-15V, Ta=25˚C, unless otherwise specified)

CHARACTERISTIC	SYMBOL	TEST CONDITION		KA4558A/AI			KA4558/I			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	V_{IO}	$R_s \le 10K\Omega$			1	5		2	6	mV
			NOTE 1		1	6			7.5	
Input Offset Current	I_{IO}				5	200		5	200	nA
			$T_A = T_{A(MAX)}$		3	200			300	
			$T_A = T_{A(MAX)}$		20	500			300	
Input Bias Current	I_{BAIS}				30	500		30	500	nA
			$T_A = T_{A(MAX)}$		20	500			800	
			$T_A = T_{A(MAX)}$		100	1500			800	
Large Signal Voltage Range	G_V	$V_{O(P-P)} = \pm$ 10V, $R_l \le 2K\Omega$			50	200		20	200	V/mV
			NOTE 1	25			15			
Common Mode Input Voltage Range	$V_{I(R)}$			±12	±13		±12	±13		V
			NOTE 1	±12	±13					
Common mode Rejection Ratio	CMRR	$Rs \le 10K\Omega$		70	90		70	90		dB
			NOTE 1	76	90					
Supply Voltage Rejection Ratio	PSRR	$Rs \le 10K\Omega$		76	90		76	90		dB
			NOTE 1	76	90		76	90		
Output Voltage Swing	$V_{O(P.P)}$	$R_L \ge 10K\Omega$	NOTE 1	±12	±14		±12	±14		V
		$R_L \ge 2K\Omega$		±10	±13		±10	±13		
Supply Current (Both Amplifiers)	I_{CC}				3.5	5.0		3.5	5.6	mA
			$T_A = T_{A(MAX)}$			4.5			5.0	
			$T_A = T_{A(MAX)}$			6.0			6.7	
Power Consumption (both Amplifiers)	Pc				70	150		70	170	mV
			$T_A = T_{A(MAX)}$			135			150	
			$T_A = T_{A(MIN)}$			180			200	
Slew Rate	SR	V_I = 10V, $R_L \ge 2K\Omega$, $C_L \le 100PF$		1.2			1.2			V/μs
Riss Time	t_{RES}	V_I = 20mV, $R_L \ge 2K\Omega$, $C_L \le 100PF$			0.3			0.3		μs
Overshoot	OS	V_I = 20mV, $R_L \ge 2K\Omega$, $C_L \le 100PF$			15			15		%

NOTE 1 : KA4558A : $T_{A(MIN)} \le T_A \le T_{A(MAX)} = 0 \le T_A \le +70$˚C
KA4558A/I : $T_{A(MAX)} \le T_A \le T_{A(MAX)} = -40 \le T_A \le +85$˚C

STR-S6708 (Hybrid IC for a Switching Regulator)

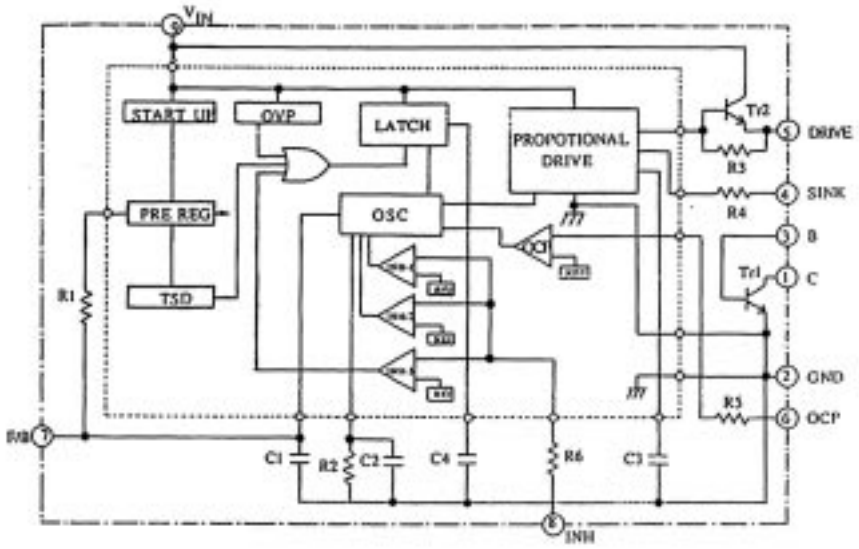
(1) General Description

The STR-S6708 is a Hybrid IC with a built in power transistor and a separate excitation control IC, designed for converter type switching mode power supply applications.
The IC is capable of quasi-resonant mode and requires small number of external component.

(2) Feature

- Small SIP isolated package : Resin sealed type (transfer mold)
- Lower power dissipation at a lighter load
- Many protection function : - Pulse-by-pulse over current protection
  - Over-voltage protection with a latch
  - Thermal protection with a latch
  - These protection functions are incorporated and can be latched with an external signal.

(3) Block Diagram



(4) Pin Description

No. of Terminal	Symbol	Description	Function
1	C	Collector Terminal	P Tr Collector
2	GND	Ground Terminal	Ground (P Tr Emitter)
3	B	Base Terminal	P Tr Base
4	SINK	Sink Terminal	Base Current (I B2) input
5	DRIVE	Drive Terminal	Base Drive Current (I B1) Output
6	OCP	Overcurrent Protection Terminal	Overcurrent Sensing Signal Input
7	F/B	Feedback Terminal	Constant voltage Control Signal Input
8	INH	Inhibit Terminal	off Time Synchronizing
		Latch Terminal	Latch Circuit Operation Signal Input
9	VIN	VIN Terminal	Control Circuit Power Supply Input

Other Function

Symbol	Function
OVP	Overvoltage Protection Circuit Built-in
TSD	Thermal Shutdown Circuit Built-in

(5) Electrical Characteristics of Control Part (Ta = 25˚C)

Description	Terminal	Symbol	Rating			Unit
			Min.	Typ.	Max.	
On-State Voltage	9-2	VIN(ON)	7.6	8	8.4	V
Off-State Voltage	9-2	VIN(OFF)	4.6	4.9	5.2	V
Operating Circuit Current	9-2	I IN(ON)	20		35	mA
Stand-by Circuit Current	9-2	I IN(OFF)	–	–	200	µA
On Time	–	T ON	33	–	41	µ sec
Off Time	–	T OFF	45	–	55	µ sec
OCP Terminal Threshold Voltage	6-2	V OCP	-1.1	-1	-0.9	V
F/B Terminal Threshold Voltage	7-2	VF/B	–	0.65	–	V
INH Terminal Threshold Voltage 1	8-2	V INH-1	0.65	0.75	0.85	V
INH Terminal Threshold Voltage 2	8-2	VIHN-2	–	1.4	2.0	V
INH Terminal Threshold Voltage 3	8-2	V Latch	3.2	5.1	5.6	V
OVP Operating Voltage	9-2	VIN(OVP)	9.2	–	10.7	V
Latch Circuit Hold Current	9-2	IH	–	–	500	µA
Latch Circuit off Voltage	9-2	VIN(La. OFF)	2.5	3.1	–	V
MIC Thermal Shutdown Starting Temp	–	Tj(TSD)	125	150	–	˚C

(6) Electrical Characteristics of Power Transistor Part (T r1) (Ta=25˚C)

Description	Terminal	Symbol	Rating			Unit	Remark
			Min.	Typ.	Max.		
Collector Saturation Voltage	1-2	VCE(sat)	–	–	0.4	V	
Collector Cutoff Current	1-2	I CEX	–	–	0.1	mA	
Base-Emitter Saturation Voltage	3-2	V BE(sat)	–	–	1.5	V	
DC Current Gain		h FE	29	–	61		
Thermal Resistance		Oj-F			1.3	˚C/W	

PCA84C 122A(IC REMOCON)

(1) Features

- ROM, RAM and I/O is device dependent
- Two test inputs T0, T1
- 3 Single-level vectored interrupt sources
- 8 bit programmable timer/counter with 5-bit pre-scaler
- Single supply voltage from 2.0V to 5.5V
- On-board oscillator 1MHz to 5MHz
- Operating temperature range -20 to +50˚C

(2) General Description

The PCA84C122A is a stand-alone micro controller designed for use in remote control unit for a wide range of applications.

(3) Pin Description

PIN	SIGNAL	DESCRIPTION
3	P00	Standard I/O Port lines, generally used for keypad scanning
2	P01	
23	P02	
22	P03	
10	P04	
11	P05	
14	P06	
15	P07	
19	P10	Standard I/O Port lines, generally used for keypad scanning
18	P11	
17	P12	
16	P13	
1	P14	
24	P15	
12	P16	
13	P17	
4	TP/INT	Test T0 and external interrupt input
5	T1	Test T1
6	RESET	Active HIGH reset, normally tied to Vss because internal Power-on reset can serve the same function
8	XTAL 1	Crystal or ceramic resonator
9	XTAL 2	
21	OUT	Pulse train output pin, capable of sinking 27mA
7	V_{DD}	Power supply
20	Vss	Ground

Circuit Description

Vision IF amplifier, AFC, video demodulator

The IF signal from the tuner is fed through a SAW filter to the differential IF input (pin 48 and 49).
The first IF stage consists of 3 AC-coupled amplifiers with a total gain control range of over 66 dB.
The reference carrier for the video demodulator is obtained by a PLL carrier regenerator
(eliminating notch filter compromises, as in reference tuned circuits for passive carrier regeneration).
Only an oscillator coil is needed(pin 3 and 4) that can be aligned via I2C-bus to the double IF frequency.

The AFC information is derived from the VCO control voltage of the IF-PLL
and can be read via I2C-bus.
Bit AFB toggles when the picture carrier is exactly at the desired IF frequency (= half the aligned IF-PLL frequency).
AFA is active in a window around this point.
For fast search-tuning applications this window can be increased by a factor 3 (AFW bit).

Tuner A.G.C.

The automatic gain control (A.G.C.) circuit operates on top sync level at negative modulated signals
or on peak white level at positive modulation, selected by MOD bit.
The tuner A.G.C. is controlled via pin 54.
The tuner A.G.C. take over point (T.O.P.) can be set over a wide range: 0.8 mVrms .. 80 mVrms
IF input signal amplitude.
The tuner AGC output may have to operate above Vcc of TDA8842.
Therefore pin 54 is an open collector output, that can operate from 0.3 up to Vcc+ 1 Volt
(at > 2 mA sink current)

Tuning

The AFC information of the TDA8842 is not available as an analogue voltage.
Automatic following (=frequency tracking, AFC) can be done via the I2C-bus by software.
The TDA8842 AFC window is typically 80 kHz wide.
This value is made higher than the 62.5 kHz tuning step, to prevent an automatic following loop from continuously adapting the tuning frequency..
With this AFC window (±40 kHz) the maximum tuning error is less than 62.5 kHz.
For high speed search-tuning-algorithms, the AFC window can be widened to 240 kHz via bit AFW.

Sound

The main functions are :

- Limiter
- PLL-Demodulator
- Pre-amplifier and mute
- Audio switch
- Volume controlled amplifier

• Limiter

The sound carrier signal is supplied to this limiter input via an external bandpass filter. This external bandpass filter is used for selectivity, the internal filter at the pin is used for noise reduction. The limiter consists of AC coupled amplifier stages. The minimum input amplitude for limiting is typical 1mVrms. The input impedance is 8KΩ in parallel with 5pF.

• PLL-Demodulator

Sound demodulation is achieved by a PLL FM-demodulator and does not need any external alignment.
The PLL has been optimised for a low S/N ratio with still an acceptable power consumption The PLL catching range is 4.2
- 6.8MHz which is suitable for all multistandard applications.

• Pre-amplifier and mute

The pre-amplifier output signal available at the deemphasis pin can be used for SCART application. At this pin the deemphasis capacitor has to be connected. The output level is 500m Vrms for a AM swing of 50kHz

A pre-amplifier with DC feedback has been provided. The DC component of the deemphasis signal is always 3V, also during sound mute. Sound mute plop is therefore minimized.

When no video signal is identified the deemphasis output is automatically muted.

• Audio switch

Anaudio switch has been provided for full SCART function. The audio switch is controlled by the I^2C bus Source Select INA/INC. for positive modulation, MOD, the external sound input is automatically selected for an external AM sound demodulator.

• Volume controlled amplifier

The volume control is active for both internal and external audio signals. The nominal gain is +9dB and minimal -71dB, which gives a total control range of 80dB minimal.
In the Fixed Audio Volume mode, FAV, the deemphasis signal is fed directly to the sound output buffer. The gain then is 1(0dB). This feature is mainly for further stereo processing where a fixed audio level is required. This saves an external buffer at the deemphasis pin.

• Automatic Volume Levelling (AVL)

The Automatic Volume Levelling(AVL) circuit is an automatic gain control on the volume which regulates the audio level to a constant sound level with non-standard TV signals (i.e. advertisement). The regulated output level can be adjusted by means of the volume control. The AVL function can be activated via I2C-bus and is available for the TDA8840/1/2/6/6A. By means of the external AVL capacitor the time constant can be chosen.

The AVL circuit works properly for an AVL input signal range of approx. 75-750m Vrms. (In external mode thus 150-1500mV). This is the so called “boost range” and is 20dB. Within the “boost range” any desired stabilised output level can be adjusted by means of the volume control. The characteristic is automatically adapted for selected crystals as 4.43MHz (PAL) and 3.57MHz(NTSC) standards by means of the 0/6dB attenuator controlled by the XA bit.
An external AVL capacitor, connected to pin 45, acts as a “memory” capacitor and integrates the audio peak signal.

The charge (or attack) current is 1mA, the discharge (or decay) current is 200nA. This equals a current ratio of 5000. The time constant is defined by the AVL capacitor.
The DC voltage (1-5V) across the AVL capacitor controls a gain stage that stabilizes the audio output level.

Horizontal and vertical synchronization

The main functions are :
- Horizontal sync separator
- Horizontal oscillator and calibration system
- PHI-1 detector
- PHI-2 dector and sandcastle generation
- Horizontal output with slow start/stop facility
- Coincidence detector
- Noise detector
- Vertical sync separator
- Vertical divider system

• Horizontal sync separator

The horizontal sync separator is supplied from the CVBS/Y inputs (chosen video source). For horizontal synchronisation the sync separator slices in the middle of the sync pulse and the slicing level is independent of the sync pulse amplitude. For the vertical synchronisation the sync pulse is sliced at level of about 30% (closer to the black level). This ensures optimal output signals for a stable horizontal and vertical deflection under various video input conditions. The top sync level is clamped at the CVBS input. The black level is stored internally.

• Horizontal oscillator and calibration system

The horizontal oscillator requires no external components and is fully integrated. The adjustment for nominal frequency is derived automatically by a calibration circuit.
The oscillator generates a sawtooth signal with double horizontal frequency. This sawtooth signal is used to derive several other gating and timing signals.
After calibration the horizontal oscillator is controlled by the PHI-1 loop for synchronisation with the incoming video input signal.
The calibrator is responsible for the automatic adjustment of the horizontal oscillator. One of the colour crystals is being used as reference. For that reason a correct crystal selection by XA, XB(Xtal selection)is very important during power-on. Calibration occurs during the vertical retrace period and only under following conditions :
- At power-on/initialization
- After power dip (shoutdown detection), re-initialization is required.
- After loss of synchronization (e.g.after channel switching)

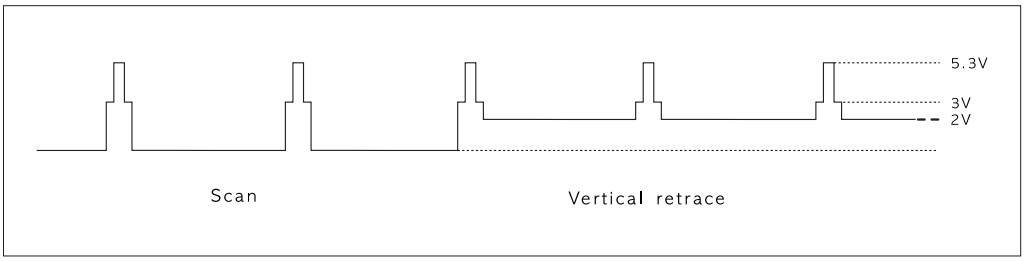
• PHI-1 detector

The PHI-1 detector is a PLL circuit that synchronizes the horizontal oscillator with the incoming video signal. The PLL compares the output of the H-sync separator with the horizontal oscillator. The PLL output current is converted to a voltage by means of the external loop filter. This voltage controls the horizontal oscillator. The loop filter is connected externally so the time constant can be defined according to the customer requirements. Because the static loop gain is very high there will be no phase shift when switching between input signals with different line frequencies (e.g.Fh with 50 and 60 Hz. systems).

• PHI-2 detector and sandcastle

As described, the Horizontal PLL(PHI-1 loop) synchronizes the horizontal oscillator with the incoming video signal. The PHI-2 loop provides a stable picture position on screen.
This is necessary because due to beam current variations the storage time of the line transistor varies and, due to that, the picture position on screen.
The PHI-2 detector compares the horizontal oscillator signal (reference)with the horizontal flyback input pulse, pin41. This flyback pulse is related to the horizontal deflection.

The PHI-2 circuit shifts the horizontal drive, pin 40, such that the picture position on screen is constant.
The flyback input pin 41 is combined with the sandcastle output. This combined function provides a three level sandcastle signal and is available starting with the highest level : burstkey, line blanking (=flyback pulse) and vertical blanking.

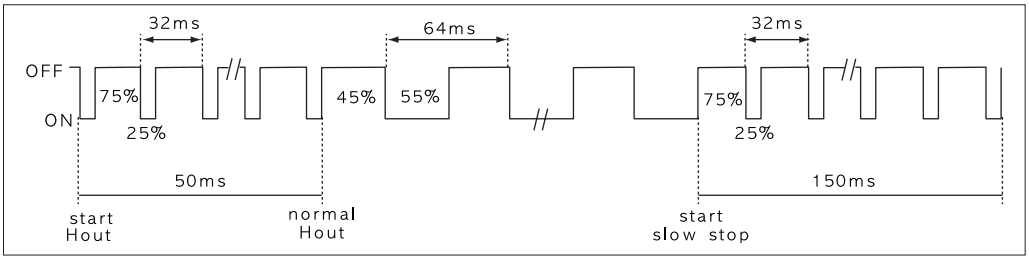


Sandcastle waveform

The phase of the video signal with respect to the deflection current can be adapted by I^2C bus Hs (horizontal shift, shift picture left/rignt).
The PHI-2 loop filter is a first order filter. The capacitor is connected externally on pin 42.

• H-output and slow start/stop

The horizontal output is the driver pin for the line deflection. It is an open collector output. Under normal operation condition the duty cycle of the output pulse is 45% off(Hout=high) / 55% on (Hout=low).
A build in slow start/stop circuit ensures a smooth start/stop behaviour of the line deflection and protects the line output transistor.
During switch-on the horizontal output starts with the double frequency (31.25kHz) and with a duty cycle of 75% off (Hout=high)/25% on (hout=low). After about 50ms the frequency is changed to the normal value (15.625kHz) and the duty cycle to 45% off (Hout=high)/55% on (hout=low).
Also during switching-off via stand by (STB) the frequency is switched to the double value and the RGB drive is set to maximum to discharge the voltage on the EHT capacitor to half of its maximum value. After about 100ms the RGB drive is set to minimum and 50ms later the horizontal drive is switched-off.



Slow start / slow stop horizontal output

• Noise detector

The TDA884X has an internal noise detector. If the PHI-1 FOA/FOB is set to 00(Automatic mode) or 10(Gated mode) the noise detector is used to switch the time constant of the horizontal PLL. The input of the detector is connected to the selected CVBS input.
The noise detector measures the RMS value of the noise during a part of the sync pulse. (The detection level is 100m Vrms and corresponds to 20dB S/N-ratio for 1Vpp CVBS).
A field counter is used for hysteresis after 2 successive fields whether noise is detected. When noise is detected the horizontal PLL time constant is switched to slow.

• **Coincidence detector (Synchronization Lock SL)**

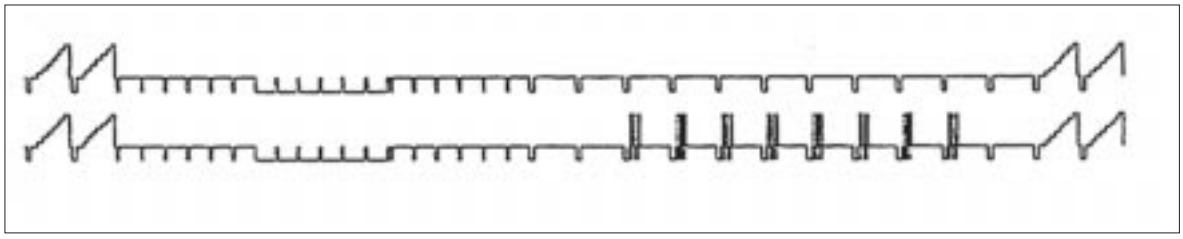
The coincidence detector detects whether the incoming CVBS signal is synchronized with the horizontal oscillator, thus whether the PHI-1 loop is in-lock. The output is available by I^2C bus, SL, and can be used for search tuning and OSD. In automatic mode (FOA/FOB=00) the coincidence detector switches for out of lock condition the PHI-1loop to fast to ansure fast horizontal catching. During search tuning the coincidence detector can be made less sensitive (about 5 dB) by control bit STM(search tuning mode). This prevents false stops.

• **Vertical sync separator**

The vertical sync separator separates the vertical sync pulse from the composite sync signal. This separated sync pulse is used to trigger the vertical divider system. To generate a trigger pulse for the divider the minimum pulse width of the incoming vertical sync pulse must be 17µs.

The integrator network is designed such that for anticopy signals (e.g. Macrovision) with vertical pulses of 10µs(0n) and 22µs(off) still a vertical sync pulse is generated. (because more lines with vertical pulses are present, pulse width of less than 17µs is allowed, by integration still the required level is reached).

To improve the behaviour for such anticopy signals, a special circuit has been implemented to prevent disturbance of the PHI-1. This circuit is only active when there is coincidence (SL=1) and a “super norm” signal is detected (exact 525 or 625 lines / frame)



Vertical synchronisation, normal(above) and with anticopy signal(below)

• **Vertical divider system**

The divider system uses a counter that delivers the timing for the vertical ramp generator in the geometry processor. The clock is derived from the horizontal line oscillator.

The divider system synchronizes on the vertical sync pulse of the vertical sync separator.

For the TDA8846/47/57 only the 60Hz figures are valid.

The divider has three modes of operation :

1. Search mode(large window)

This mode is activated when the circuit is not synchronized or when a non-standard signal is received. In the search mode the divider can catch between about 45 and 64.5Hz. For the TDA8846/47/57 these figures are about 54 to 64.5Hz)

Only in RGB input mode, the catching range is enlarged and ranges from 45 to 72 Hz. (54 to 72 for TDA 8846/47/57). With this range it is possible to display converted Personal Computer signals on an adapted TV-receiver.

2. Standard mode (narrow window)

This mode is switched on (coming from search mode) when more than 15 successive vertical sync pulses are detected in the narrow window. When the circuit is in the standard mode and a vertical sync pulse is missing the retrace of the vertical ramp generator is started at the end of the window (thus automatic insertion of missing vertical sync pulses). As consequence the disturbance of the picture is very small. The circuit will switch back to the search window when 6 succeeding vertical periods no sync pulses are found within the window. In the narrow window mode the PHI-1 is inhibited during the verical eqalization pulses to prevent disturbance.

3. Standard TV-norm : divider ratio 525(60Hz) or 625(50Hz)
When the system is switched to the narrow window (standard mode) it is checked whether the incoming vertical sync pulses are according to the TV norm, if so IVW=1, When 15 standard TV-norms are counted the divider system is switched to the standard divider ratio mode. In this mode the divider is always reset at the standard value even if the vertical sync pulse is missing.
The system switches back to the narrow window when 3 vertical sync pulses are missed. When also in the narrow window 3 vertical sync pulses are missed the divider will switch to the search window mode.

As described above the vertical divider needs some waiting time before switching back to the search window mode. When a fast reaction is required for instance during channel switching the system can be forced to the search window by means of I^2C bus, setting NCIN=1 (vertical divider mode). Immediate after forcing to search mode NCIN has to be set back to 0 for optimum performance.

The vertical synchronisation mode of operation can be selected by I^2C bus FORF/S, forced field frequency. Furthermore50/60Hz identification is available by I^2C bus FSI(50/60Hz), and norm signal identification with IVW. Interlace can be switched on and off by I^2C bus DL.

Geometry (vertical & horizontal) and drive of vertical deflection

We can distinguish the following main blocks, which will be described in more detail below :
- Vertical sawtooth generator
- Vertical geometry processor
- Horizontal(E-W) geometry processor
- EHT tracking + overvoltage protection

• **Vertical sawtooth generator**
The vertical sawtooth generator delivers the reference signals for vertical and horizontal geometry processor. An accurate reference current (Iref)of 100µA is realised by means of an internal bandgap reference voltage(3.9V) and an external resistor (39kΩ). This 100µA reference current is used to derive a 16µA current to charge the external capacitor during vertical scan. This circuitry ensures a very linear sawtooth(Usaw) that is used for further processing on vertical and horizontal(E-W).

The charge current for the sawtooth is automatically adapted for 50/60Hz via control bit FSI. Furthermore the charge current can be adjusted with the I^2C bus control, VS(vertical slope). The range of +/– 20% should be used to compensate for tolerance of the extrnal capacitor. When vertical zoom is applies, VS. can be used to vary the position of the bottom part of the picture independent from the upper part (subtitle shift)

The external capacitor is discharged during vertical retrace by the vertical divider system.

• **Vertical geometry processor**
The sawtooth signal that is derived from the sawtooth generator can be controlled by I2C bus. Control functions are : VA(Vertical Amplitude, VSH(Vertical Shift), SC(S-Correction), VX(Vertical eXpand(zoom)), VSC(Vertical SCroll).

The vertical geometry processor has a differential current output for a DC coupled vertical output stage(drive). It is important to notice that the TDA884X is designed for use with a DC coupled output stage. This is the reason why a vertical linearity alignment is not necessary (and therefore not available).

A half picture blanking function (service blanking, SBL) is available for vertical alignment.

• **Horizontal geometry processor(E-W drive)** (Not in all versions)
The horizontal geometry signal for E-W drive can control via the I^2C bus the following functions :
EW(EW-Width), PW(Parabola/Width), CP(Corner/Parabola) and TC(Trapezium Correction).
The EW-width adjust range is such that linear zoom is possible on the picture size when used together with vertical expand (zoom).
The horizontal geometry processor has a single-ended current output for E-W drive.

• **EHT tracking + overvoltage protection**

Both the vertical and the E-W drive can be modulated for EHT compensation.
This tracking makes the picture size independent of EHT variations due to the beam current. The compensation range is -5 to +5%. The horizontal tracking can be switched off by I^2C bus function HCO(Horiz. Compensation).

A second function of this pin is for overvoltage protection, XPR(X-ray PRotection). XPR is set to “one” when the voltage on the pin exceeds 3.9 Volts and can be read by I^2C bus. It is possible to switch the horizontal output automatically off via slow stop for XPR = 1 when PRD (PRotection Detection mode) is set to 1.

Filters and CVBS/Y/C switches

See also the related block diagram as well as the diagrams at the end of the report.

The main functions are :
- $CVBS_{INT}$, $CVBS_{EXT}$, CVBS/Y and Chroma signal selection.
- Filter calibration.
- Chrominance signal processing.
- Luminance signal processing.

• **$CVBS_{INT}$, $CVBS_{EXT}$, CVBS/Y and Chroma signal selection**

The input selector has $CVBS_{INT}$, $CVBS_{EXT}$, CVBS/Y and Chroma as inputs which can be selected via the I^2C bus(INA, INB, INC)

For the TDA884X/5X devices, the selected video signal, CVBS1 out(2Vpp), is present at pin 38.
When Y/C is selected then the Y and C signals are added to form a CVBS signal and then supplied to the CVBS1 output.

• **Filter calibration**

The filter calibration loop is an auto-tuning loop which calibrates every field retrace. The loop is stabilised when the resonant frequency of the cloche filter is Fsc(Fsc = VCXO reference signal which is at 4.4MHz or 3.6MHz depending upon which Xtal is selected).
The chroma bandpass and chroma trap filters are also controlled to Fsc. The chroma bandpass centre frequency can be set to 1.1Fsc via I^2C bus command CB.
For SECAM reception the cloche resonant frequency is set to 4.28MHz and the chroma trap is shifted to 4.3MHz to ensure optimal subcarrier rejection.

• **Chrominance signal processing**

For chroma signal processing, the selected signal is supplied to both the PAL/NTSC chroma bandpass filter and the SECAM colche filter via a variable gain amplifier which is controlled by ACC and ACL detection circuits.
The dynamic range of the ACC is 26dB and detects only the burst amplitude; consequently the burst signal at the bandpass/cloche filter input is constant for a burst signal range +6dB–> -20dB where 0dB = $300mV_{PP}$ burst.
The ACL is a chroma amplitude detector and is active when the chroma/burst ratio exceeds approximately 3. It ensures that CVBS signal to chroma bandpass & cloche filter is limited for large chroma/burst ratios(>3). which results in a constant saturation for such non-standard transmissions.
The ACL is independent of the ACC; it controls only the chroma amplitude and does not influence the colour burst sensitivity. The ACL function can be switched on/off via bus command ACL.
The output signal of the chroma bandpass circuit is supplied to the PAL/NTSC decoder and the output signal of the cloche filter is supplied to the SECAM decoder for further chroma processing.

• **Luminance signal processing**

For luminance processing, the selected video signal is supplied to the H/V sync circuits for sync processing and also to an adjustable delay line (Ons - 320ns, minimum step is 40ns, controlled via bus bits YD0-YD3).

The chroma trap is bypassed for no burst transmissions when in own intelligence mode (automode).

In Y/C modes the video signal follows a direct path with 160ns delay so as to ensure similarity with chroma path delay.

The output signal is supplied to the peaking and coring stages whose operation is illustrated below.

The peaking function is realised with t = 160ns delay cells (i.e. frequency response reaches a maximum at a frequency f = 1/2t = 3.125MHz).

The coring function has a non-linear transfer characteristic which implies that a noise suppression range (coring range) of 15 IRE is realised. This means that extra noise introduced due to increased gain of the peak ng amplifier is defeated by the coring function. The coring stage is activated via the I^2C bus (COR).

Asymmetric peaking is introduced to enhance picture definition. The negative/positive overshoot ratio is approximately 1.8.

The degree of peaking is controlled by the peaking amplifier via the I^2C bus (PEAKING). The output of the peaking amplifier is summed with the delayed (160ns) selected video signal. The output of the peaking/coring stages (i. e. output of summing stage) is fed as internal luminance signal (Y_{INT}) to the YUV selection circuit.

Colour Decoder

The main functions are:

- PLL/VCXO
- PAL/NTSC demodulation
- SECAM demodulation
- ASM (Automatic System Manager)

• PLL/VCXO

The PLL operates during the burstkey period; it generates a VCXO reference signal (f_{VCXO}), in phaselock with the incoming burst signal(f_{BURST}).

Prior to lock condition, the signals f_{VCSO} and f_{BURST} are not synchronous and are present at phase detector input.

The loop filter averages the phase detector output current and the resulting control signal to the VCXO is proportional to $Sin(2\pi\Delta ft)$ where $\Delta f = f_{VCXO} - f_{BURST}$.

A lock situation occurs when Δf<VCXO holding range; once in lock, the phase detector output current is proportional to $\Theta_E = \Theta_{VCXO} - \Theta_{BURST}$ (Θ_E is the static phase error).

The combined phase detector and VCXO sensitivity is high gain mode when a colour system is not yet identified.

For fast colour acquistion, the phase detector is in high gain mode when a colour system is not yet identfied.

The VCXO loop(not to be confused with phase locked loop, PLL) compensates for any attenuation loss or phase shift in the crystal so that the it's loop gain is unity and loop phase shift is zero. The VCXO reference outputs (0˚ and 90˚) are stable sinusoids.

VCXO oscillation is at series resonance of the selected Xtal. Since the PLL automatically tunes the VCXO to the burst (if inside the PLL holding range) fine tuning of the VCXO with a trimming capacitance is not necessary.

The motional capacitance of the Xtal is damped by the internal resistance of the VCXO pins (i.e. 1K) in dorder to realise the holding range.

The catching range (pull-in) of the PLL loop is governed by the PLL loop filter; the loop filter can be chosen so that PLL holding and catching range are similar (direct catching).

The HUE phase rotator is inoperational when the PLL is active (i.e. no phase rotation during the burstkey period).

Outside the burstkey period, the hue control rotates the VCXO reference phases from -40˚ to 40˚ linearly for I2C bus command (HUE:0 –>63).

• PAL/NTSC demodulation

The 0° and 90° reference signals from the VCXO are supplied to the HUE phase rotator; it's outputs (H0, H90) are supplied to the (B-Y) and (R-Y) burst demodulators respectively.
The demodulated burst from the (B-Y) demodulator supplies NTSC ident information to the ASM(IDN signal).
The demodulated burst from (R-Y) demodulator supplies PAL ident information to the ASM(IDP signal).
For correct demodulation of (R-Y) PAL burst and chroma signals, then the H90 signal requies 180° phase shift on alternate lines. This is realised with the H/2 switch before the (R-Y) demodulator. It is not active during demodulation of NTSC signals.
The (B-Y)/(R-Y) baseband signals are obtained from the chroma signal by the (B-Y)/(R-Y) demodulators, filtered and supplied via the PAL/SECAM $_{SWITCH}$(PS) to the internal baseband delay line.
The demodulator gain ratio (B-Y)/(R-Y) is typically 1.78 in order to compensate for scaling in the transmitter.
For NTSC applications it is possible to bypass the delay line via I2C bus command BPS; the gain is also corrected then by a factor two.
The V_{INT} and U_{INT} signals from delay line outputs are fed to the YUV selection circuit (see YUV/RGB processing part).

• SECAM demodulation

SECAM demodulation is realised with a PLL type demodulator.
When the VCXO is connected to pin 35 (controlled by XTS) and if a 4.43MHz Xtal is present on that pin then SECAM demodulation is possible. The auto tuning loop, consisting of PLL demodualator and oscillator, ensures that the PLL oscillator is locked to the 4.43MHz Xtal frequency during calibration time in the vertical retrace period. The SECAM reference voltage, generated at pin 16, is regulated in order that the PLL demodulator output is set to a reference voltage derived from a stable bandgap voltage.
Outside calibration the oscillator remains tracking the SECAM chrominance resulting in the corresponding demodulated voltage. This is delivered to the LF de-emphasis stag and to the line ident stage of the Automatic System Manager (IDS signal). The H/2 switch distributes the demodulated signal to the (R-Y) and (B-Y) amplifiers and via the PAL/SECAM switch(PS) to the baseband delay line. The bypass mode of the delay line is not possible for SECAM.
The V_{INT} and U_{INT} signals from delay line outputs are fed to the YUV selection circuit (see YUV/RGB processing part).

• ASM (Automatic System Manager)

The ASM is field synchronous; it can identify PAL/NTSC/SECAM colour standards. The different possibilities are controlled by the I^2C bus input commands. These input commands are communicated to the ASM via the I^2C bus.
The I2C bus input commands, also supplied to the ASM via the I2C bus, indicate which Xtals must be connected to pins 34 and 35. This is exxential for correct calibration of the horizontal oscillator.
The I2C command FCO disables the colour killer in forced modes only and allows maximum colour sensitivity.
For colour identification purposes there is also communication with the ASM and:

- the PAL/NTSC ident circuits (IDP, IDN)
- the SECAM ident (IDS)
- the VCXO via Xtalswitch (XTS)
- the PAL/SECAM switch (PS)
- the R-Y demodulator (H/2)

RGB processing and control

This paragraph can be divided into :

- YUV/RGB processing
- RGB-control

(1) YUV/RGB processing

• The main functions are :

- Y-signal processing/black stretcher
- (B-Y)/(R-Y) signal processing/matrixing
- Dynamic skin tone correction
- Second RGB insertion

• Y-signal processing/black stretcher

Internally the luminance signal is clamped and supplied to the RGB matrix circuit (via black stretcher).

The black stretcher circuit, which is only operational during line scan, extends the grey signal level towards the act 1 black level (i,e,actual black level is measured during burstkey). The amount of extension is dependent upon the difference between actual black level and the darkest part of the incoming video signal; it is thus dependent upon the IRE value of the video signal.

The darkest part of the video signal is registered on an internal-capacitor by means of an internal discharge current of approximately 130mA.

For black stretcher input/output characteristics, refer to device specification.

The black stretcher can be switched on/off via the I^2C bus (BKS). The black stretcher is fully integrated this means that the black stretcher time constant is fixed.

• (B-Y)/(R-Y) Signal processing/matrixing

The (B-Y)/(R-Y) signals are clamped during the burstkey period. The saturation of the (B-Y)/(R-Y) signals is controlled via the I^2C bus(SAT). The control range is minimal 52dB with a 6dB (minimum) reserve above nominal; refer also to device specification. The (B-Y)/(R-Y) signals are supplied to dynamic skin control function

The selected matrix is controlled via the I2C bus(MAT).

In the I^2C bus description can be seen which matrix can be selected for the several TDA884X types. After the R-Y, B-Y martixing, the output-signals are added with the luminance signal in order to generate the internal RGB signals

• Dynamic Skin Tone Correction

The Dynamic Skin Tone Correction (DSTC) circuit corrects the hue of those colours which are located in the UV-plane area that matches to skin tones. Correction takes place by shifting those colours towards the preferred skin tone axis. The amount of correction is dependent on the luminance, saturation and distance to preferred skin tone axis. Therefore it's hard to give an exact figure about the amount of correction. The DSTC can be switched on by the I2C-bit DS(Dynamic Skin), also it is possible to switch between two skin tone correction angles by the DSA bit. If it set to "0" the correction angle is 117 degrees;

If it is "1" the correction angle 123 degrees. There are two angles because depending on which part of the world there is a preferred skin tone. For example the 117 degrees angel can be the preferred skin tone in Asia where as in the USA 123 degrees may be preferred.

RGB signal selection has three modes to choose from:

- RGB (composite)
- fast RGB insertion ($R1_{IN}G1_{IN}B1_{IN}$)
- OSD mode

Before the RGB signal selection the RGB signals are clamped to a similar DC level during burstkey period.
Selection is controlled by the RGB insertion input switch. Fast insertion on the RGB inputs is made active/inactive via the I²C bus(IE1). With the I²C bit IN1 the status of the insertion switch input is sensed.

The RGB input stages (i,e,RGB clamps and selection) are linear circuits to handle RGB signals supplied from the SCART connector.

• Second RGB insertion

The RGB signals inserted via the second RGB-internal YUV-signals are selected. At the YUV-outputs the selected signal will be available. Converting the RGB signals to YUV signals has the advantage that the YUV-interface and the YUV processing of the one chip can be used.

(2) RGB-control

• RGB processing

The selected RGB signals (i,e,composite RGB and Rin, Gin, Bin) are via the I²C bus controlled on

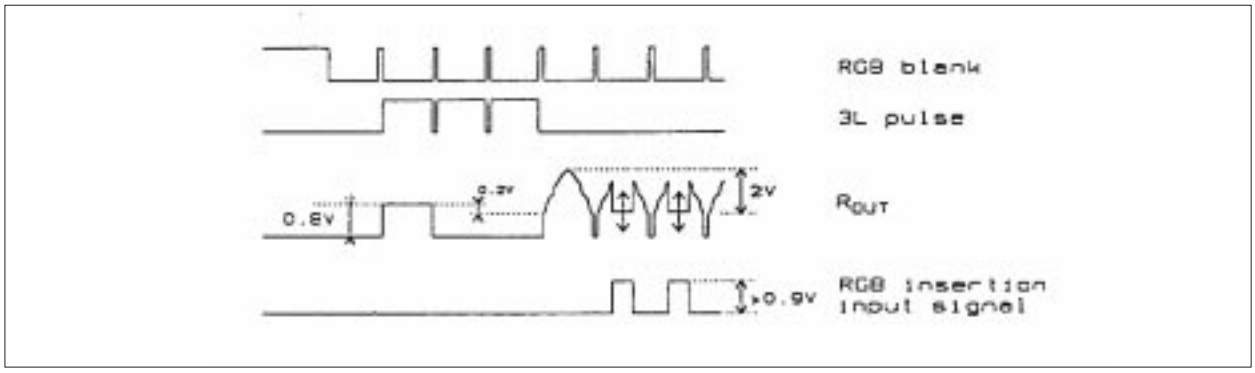
- contrast
- brightness
- RGB white-point adjust (one individual control per channel)

In OSD mode these RGB signal controls are inactive. OSD is added at the RGB output pins, which then provide nominal black levels at the RGB-outputs only.

Contrast can be adapted over a 20dB gain range by means of the I2C function : CONTRAST:00 –> 63.
Nominal contrast setting is realised with I²C bus setting CONTRAST = 32.

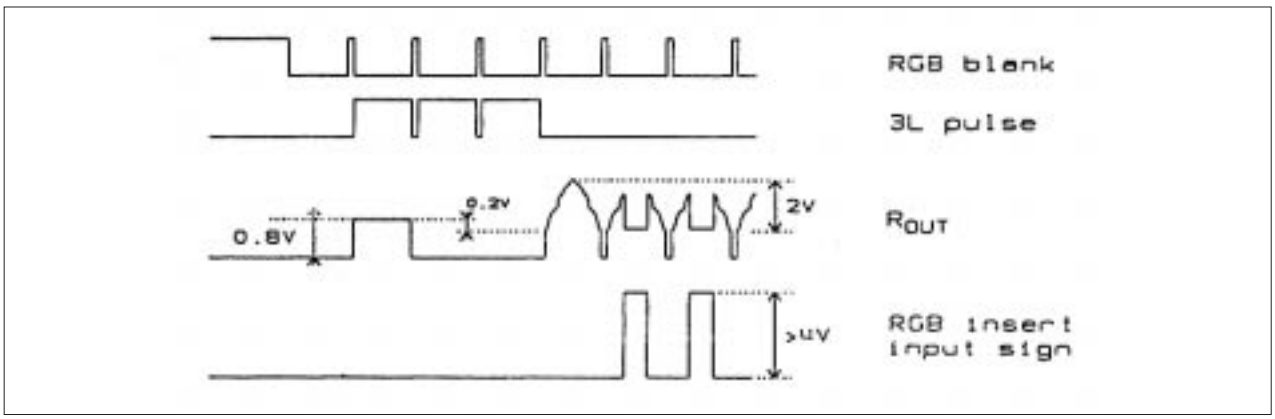
For brightness, a change of DC-level of ± 0.7V at RGB output (w.r.t to nominal) is possible fora change in I²C bus command (BRIGHTNESS:00 –> 63). For nominal brightness, the RGB output is at black level which is equivalent to a $I_{CATHODE}$ of the CRT of 0mA

For white-point adjustment, a ±3dB change in channel gain is possible for a change in I²C bus commands (WHITE POINT RGB:00 –> 63.) Nominal white-point adjustment settings are realised with I²C bus setting WHITE POINT RGB = 32.



RGB output illustration during fast insertion

For fast insertion on R_{IN}, G_{IN}, B_{IN} inputs then brightness, contrast and white point RGB is possible



RGB output illustration during OSD mode

During OSD, the DC level on RGB outputs is 200mV less then DC level on RGB outputs during black current measurement (contrast, brightness and white point RGB are inactive)

• Blue stretcher

The Blue stretcher can be divided into two stretch-frunction
- the Standard blue stretcher
- the Extended blue stretcher

The blue stretcher reduces the R- and G- signals by 14% whenever the video signal exceeds a threshold level of 80%.

The extended blue stretch
With the extended blue stretch the reduction of the G-signal is 8% and for the R-signal it is 22% whenever the signal exceeds the threshold level of 80%

When adjusting the white point be sure that the blue stetcher is inactive. In principal all features should be switched off during white point adjustments.

• RGB output stages.

Looking at the RGB output signals several DC-levels can be seen.
The DC-levels of the H- and V-blanking are 0.5V below nominal black level of the video signal.
At the end of the vertical blanking (line 19, 20, 21) the measuring pulses for Continuous Cathode (CCC)loop or two point black current stabilisation can be observed.
These measuring pulses have three DC-levels:
- A DC-level of-0.1V with respect to nominal black level during the leakage measurement (LO). This level is chosen so that it lies close to the black level in order to have an accurate measurement close to cut off voltage of the picture tube
- A pulse of +0.25V with respect to nominal black level, which corresponds with a cathode current of 8µA
- A pulse of 0.38V above nominal black level which corresponds with a cathode current of 20µA

The pulse-levels of +0.25V and +0.38V can only be seen measured on alternating fields.

The RGB blanking level tracks with the DC level of the black current measurement pulses. The RGB output stages supply the buffered RGB signals to pins 21, 20 and 19 respectively.

• Continuous Cathode Calibration (CCC)

The Continuous Cathode Calibration (CCC) loop (or two point stabilisation loop) is an auto-tuning loop which stabilises th black level (offset) as well as the cathode drive level (gain) of each gun of the CRT sequentially and independently on alternating fields.

In case of no stabilisation, the transfer characteristic changes as function of temperature and ageing of the tube.
The CCC-loop can be divided into two loops :

- a black level stabilisation loop. (offset compensation)
- a cathode drive stabilisation loop. (gain compensation)

• Beam current limiter / vertical guard

The beam current limiter circuit functions as an average beam current limiter(ABL) as well as peak white limiter (PWL). The average beam current limiter needs external circuitry to function it a relative slow function. The peak white limiter is an internal detection circuit, which has a fast function;
Both functions reduce the contrast and brightness of RGB signals.
The peak white limiter comes into action if the difference between measurement DC level and white level exceeds approximately 2.6V (at nominal white point settings). Then an internal (peak white limiter) discharge current (I_{PWL}) of 200µA will flow, then V_{BCL} decreases; if no capacitor is present at the BCL (no integration), then V_{BCL} will fall immediately after peak signal detection.
For both average beam current limiting and peak white limiting :

- contrast reduction begins when $V_{BCL} < 3.0V$;
- brightness reduction begins when $V_{BCL} < 2.0V$.

V_{BCL} is normally 3.3V when average beam current limiting and peak white limiting are not active.
The contrast and / or brightness reduction of the RGB_{OUT} is proportional to the voltage decrease on the BCL pin.

Besides the beam current limiter input the vertical guard input is added to the same pin of the TDA884X, both functions are independent of each other.
The vertical guard blanks the RGB_{OUT} when the vertical deflection fails. The vertical deflection works correctly when the vertical gurad circuitry in the TDA884X detects a pulse level above 3.7V during the vertical retrace.
The vertical guard function indicates vertical deflection as “failure” when there are no pulses during vertical retrace and / or the DC level is continuosusly above or below the verticl guard detection level of 3.7V.

Power Supply STR-S6708

(1) V_{IN} terminal, start-up circuit

Astart-up circuit is to start and stop a operation of a control IC by detectiong a voltage appearing at a V_{IN} terminal (pin-9). At start up of a power supply, when a voltage at the Vin terminal reaches to 8V (typical) by charging up C6 by the function of a start-up resistor, Rs, a control circuit starts operating by the function of the start-up circuit.

(2) Oscillator, F/B terminal voltage (pin#7)

A oscillator generates pulse signals which turns a power transistor on and off by making use of charge. and discharge of C1 and C2 incorporated in the Hybrid IC. (refer to the block diagram of page 30)

Constant voltage control of a switch mode power supply is performed by changing both ON-time and OFF-time except when the load is light (ex. remote control stand-by mode of TVs).

When the power transistor is on C2 is charged to the set voltage (approx. 2.3V at Ta = 25˚C). ON the other hand, C1 starts charging up through R1 from almost 0V and the voltage across C1 increases in accordance with the inclination determined by the product of C1 and R1. When the voltae across C1 reaches approx. 0.75V (Tc = 25˚C), the output from the oscillator is reversed and the power transistor turns off. At the same time C1 is quickly discharged by the function of a internal circuit of the oscillator and the voltage across it decreases to almost 0V. When the power transistor turns off, C2 starts discharging through R2 and the voltage across C2 decreases in accordance with the inclination determined by the product of C2 and R2. When the voltage across C2 decreases to about 1V, the output from the oscillator is reversed again and the transistor continues turning on ad off by repeating the above mentioned operations.

The ON-time determined by the above C1 and R1, and the OFF-time determined by C2 and R2 shall be respectively the maximum ON-time and maximum OFF-time of the power transistor. R1 and R2 are fixed at specific values by in-line functional trimming.

The ON-time is controlled by changing a charge current of C1, which is as the result of that a photo coupler connected to the F/B terminal (Pin #7) has the current in accordance with a output signal from a output voltage detection circuit (an error amplifier) provided in the secondary output flows to the terminal. As an AC input voltage to the power supply gets the higher and a load current the smaller, the current flowing to the F/B terminal gets the larger, and the ON-time gets the shorter.

(3) Function of INH terminal (Pin #8), control of OFF-time

Signal to the INH terminal is used as inputs to COMP.1 and COMP.2 inside of the control IC. A threshold voltage of COMP.1, V_{TH1} is set at 0.75V (Ta=25˚C) and an input signal to a drive circuit becomes almost 0V (the power transistor is in OFF mode) when a voltage at the INH terminal reaches the V_{TH1}. As long as the INH terminal voltage does not get lower than V_{TH1}, the power transistor sustains OFF mode. On the other hand, a threshold voltage of COMP.2, V_{TH2} is set at 1.5V (Ta=25˚C). When the INH terminal voltage reaches V_{TH2} an output from COMP.2 reverses and, as a result, C2 starts firing and a voltage across C2 drops to almost 0V in a moment. As the result of this immediate discharge of C2, the OFF-time of the oscillator which has been determined by the product of C2 and R2($\approx$55µsec) can be quicker up to approx. 2µsec. As long as the INH terminal voltage does not get lower than V_{TH2}, a voltage across C2 stays at almost 0V and a output from the oscillator keeps the power transistor being OFF.

(4) Quasi-resonant operation

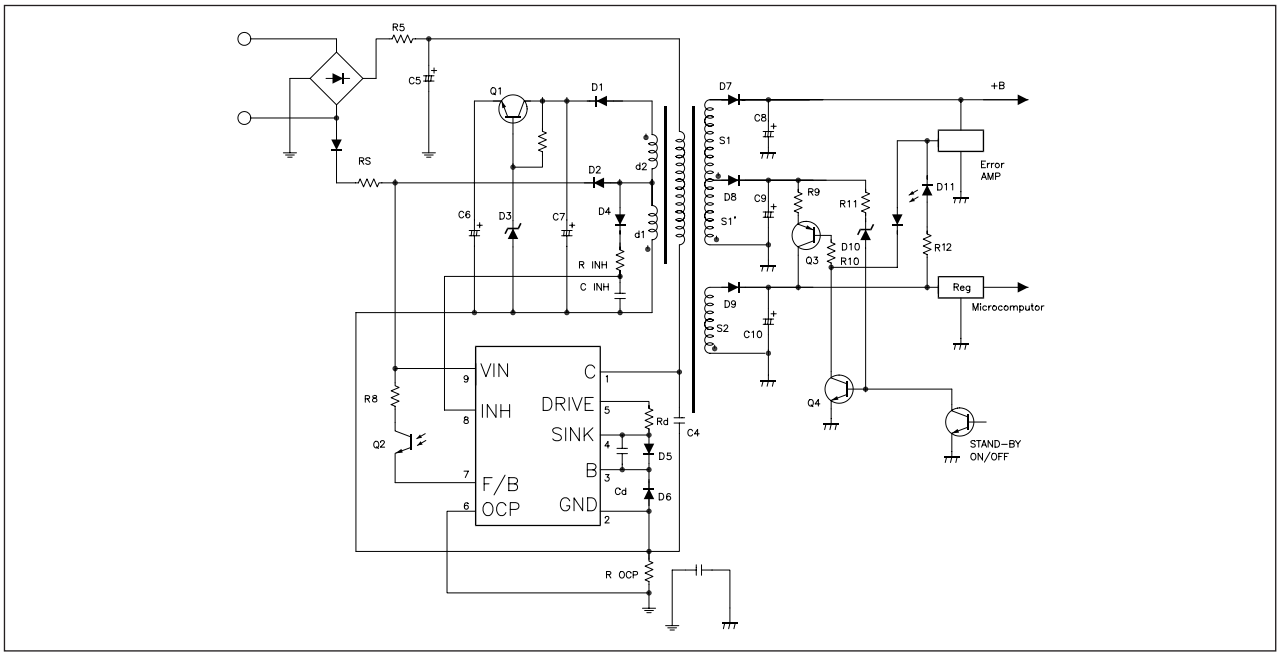
By inputting a voltage signal which is synchronized with the energy discharge time of a secondary winding of a transformer to the INH terminal, quasi-resonant operation can be achieved.

(5) Stand-By Mode

When going into light load mode such as remote control standby mode, internal impedance at a signal terminal of a microcomputer gets higher. Then the microcomputer have the current, I1, which has been bypassed from C9 through R11 and D10 by the function of a microcomputer, flow into the base of Q4 to turn it on. As a current flows via R12 and D11 into a photo coupler when Q4 to turn it on, each output voltage (including voltages of d1 and d2 windings) starts descending and becomes stable when the voltage of the winding, S1 reaches Vs ($Vs=V_{R11}+V_{Z(DIO)}+V_{BE(Q4)}$). In this event, a voltage across C10, which is a line voltage to the microcomputer, also descends and consequently the microcomputer cannot be activated. A stable power source for the microcomputer can be established by supplying the current, I2, from C9 through R9 and Q3 while Q4 is on.

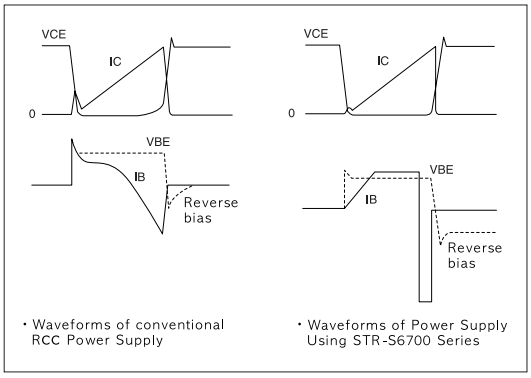
Since the voltages of d1 and d2 winding in the primary also go down according to their ratios to S1' at the same time, power shall be supplied to the V_{IN} terminal (Pin #9) from d2 winding when the load is light. In addition, because a voltage at the INH terminal (Pin #8) gets lower than V_{TH1} in accordance with the decrease of D1 winding voltage, OFF-time of the power transistor is fixed at set time (T_{OFF}=50µsec at Ta=25˚C) of the built-in oscillator, and only ON-time changes depending on input and output conditions of the power supply. Therefore, it enables to hold an oscillation frequency in light load mode below 20KHz(typical).

• Refer to the Typical Application Circuit below



(6) Drive circuit

The STR-S6700 series applies the proportional drive system in order to minimize turn-on and saturation loss, and storage time. In the conventional RCC system, turn-on loss and switching noise due to the surge current appearing when the power transistor turns on are high as because the transistor is driven by the drive current shown at the right . In addition, since I_B decreases linearly when the transistor turns off and a peak value of I_{B2} is not large, the storage time is long and the $V_{CE(SAT)}$ voltage is high, which results in large turn-off loss.

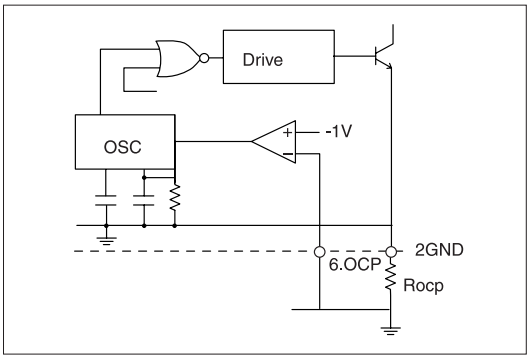


• Waveforms of conventional RCC Power Supply

• Waveforms of Power Supply Using STR-S6700 Series

(7) OCP (overcurrent protection) function

Overcurrent protection is performed pulse by pulse by directly detecting collector current of the power transistor. Configuration of the OCP circuit is shown at the right. Detecting voltage is set to -1V below a reference point of GND(ground). In addition, since the detecting voltage is set by a comparator, very stable characteristics against temperature is achieved and drift of the detecting voltage against temperature change is almost 0V.



(8) Latch circuit

It is a circuit which sustains an output from the oscillator low and stops operation of the power supply when overvoltage protection (OVP) circuit and thermal shutdown(TSD) circuit are in operation. As the sustaining current of the latch circuit is 500µA maximum when V_{IN} terminal voltage is 4V, the power supply circuit sustains the off state as long as current of 500µA minmum flows to V_{IN} terminal from a start-up resistor. In order to prevent a malfunction to be caused by a noise and so on, delay time is provided by C1 incorporated in the IC and, therefore, the latch circuit operates when the OVP or TSD circuit is in operation, or an external signal input is provided for about 10µsec or longer. In addition, even after the latch circuit start operating, the constant voltage regulator (Reg) circuit is in operation and the circuit current is at high level. As a result, V_{IN} terminal voltage rapidiy decreases. When V_{IN} terminal voltage become lower than the shutdown voltage, $V_{IN(OFF)}$, (4.9V typical), it starts increasing as the circuit current is below 500µA. When it reaches the ON-state voltage, $V_{IN(ON)}$ (8V typical), Vin terminal voltage starts decreasing because the circuit current increases again.

(9) Thermal shutdown circuit

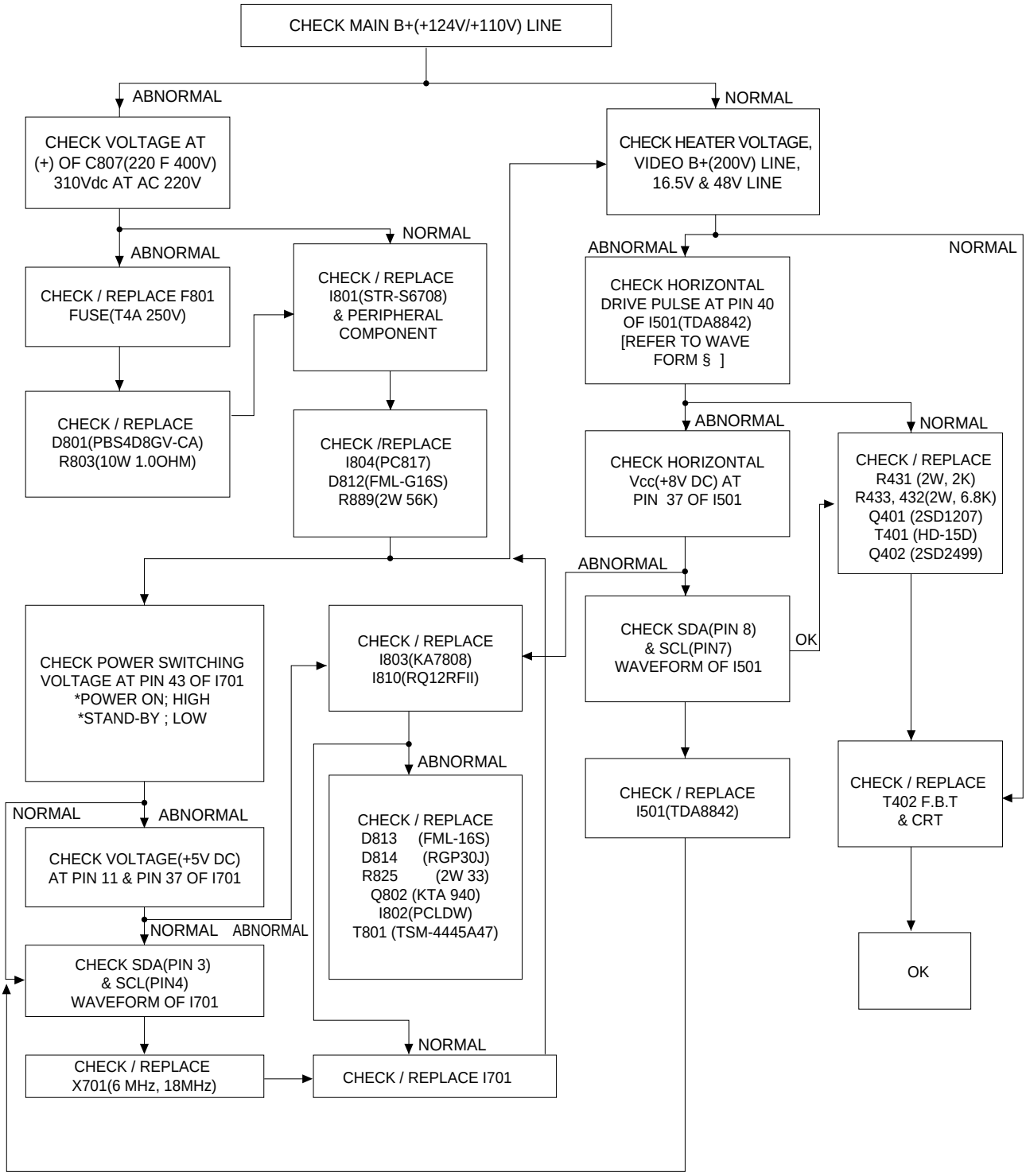
It is a circuit to trigger the latch circuit when the frame temperature of the IC exceeds 150˚C (typical). Although the temperature is actually sensed at the control chip, it works against overheating of the power transistor as the power transistor and the control IC are mounted on the same lead frame.

(10) Overvoltage protection circuit

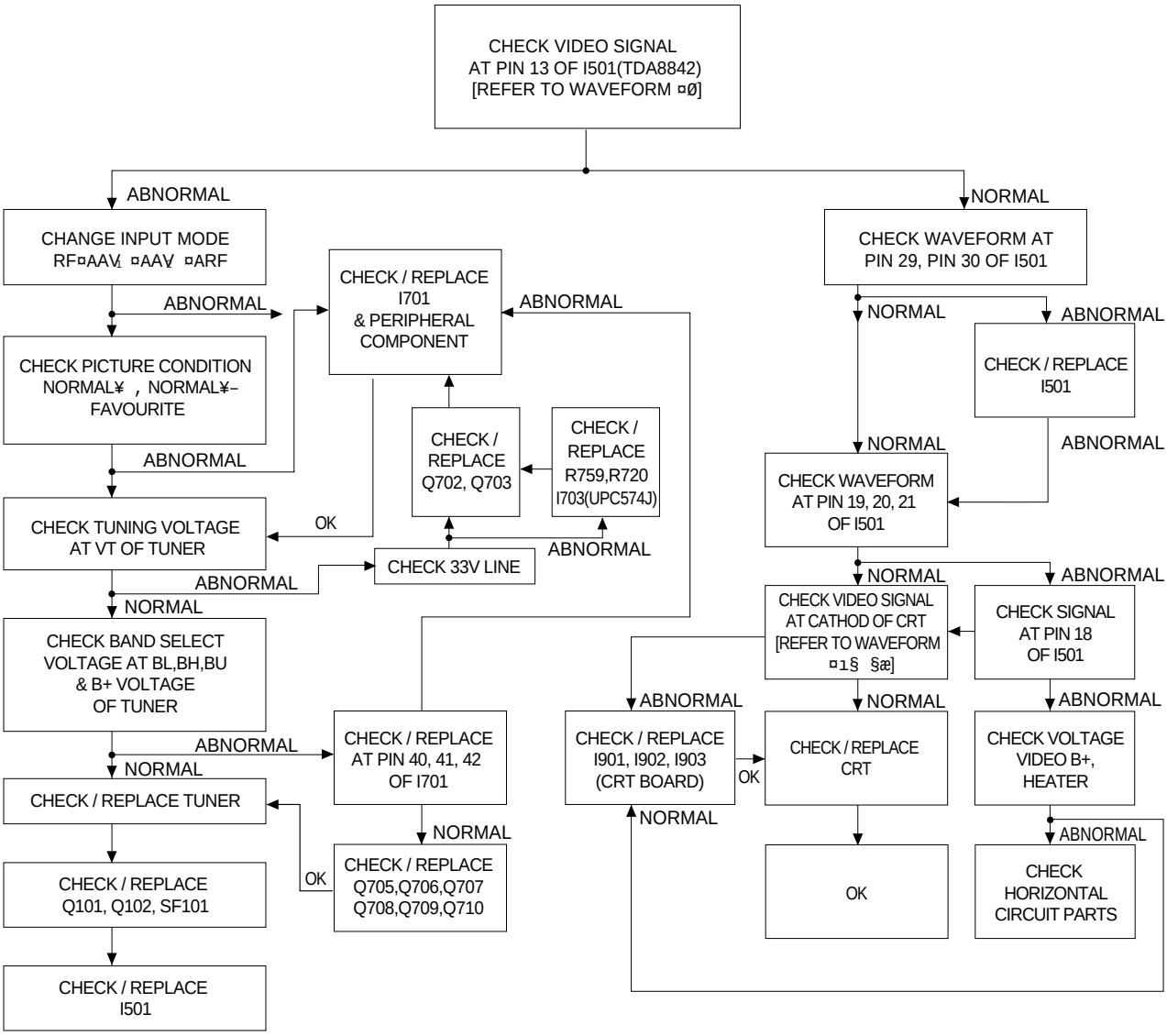
It is a circuit to trigger the latch circuit when Vin terminal voltage exceeds 10V (typical). Although it basically functions as protection of V_{IN} terminal against overvoltage, since V_{IN} terminal is usually supplied from the drive winding of the transformer and the voltage is proportional to the output voltage, it also functions against the overvoltage of secondary output which cause when the control circuit opens or in some other events.

■ Trouble Shooting Charts

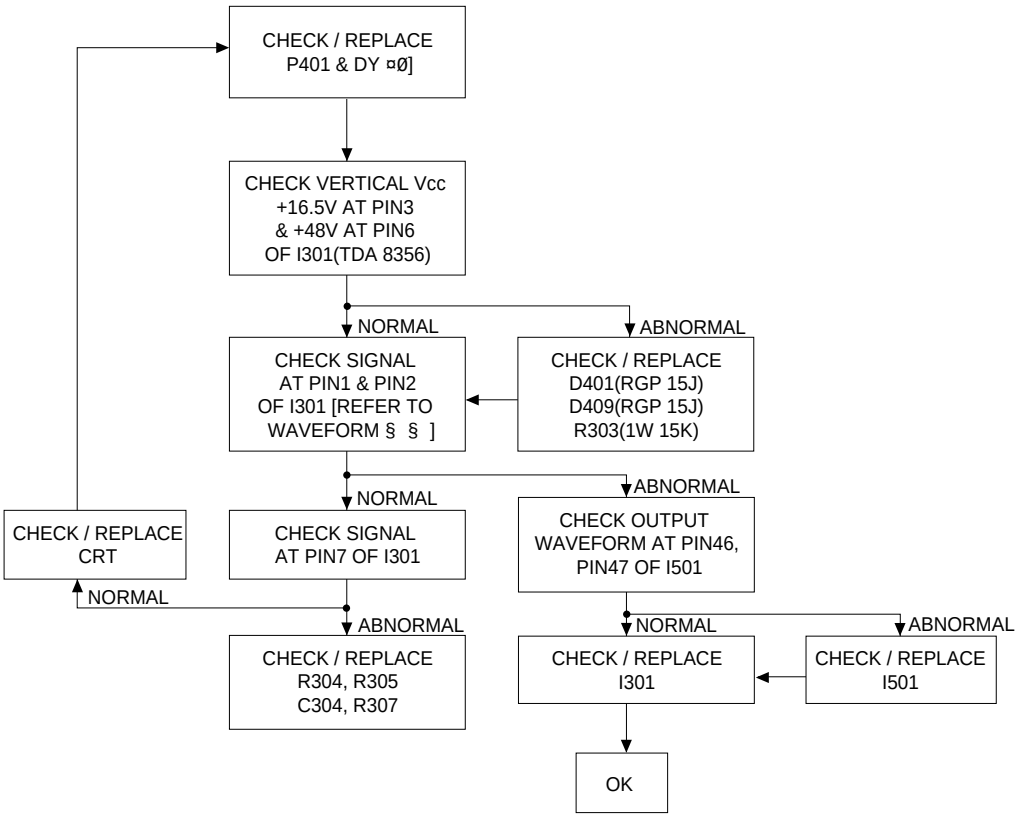
1. NO RASTER


CHECK MAIN B+(+124V/+110V) LINE
ABNORMAL
NORMAL
CHECK VOLTAGE AT (+) OF C807(220 F 400V) 310Vdc AT AC 220V
CHECK HEATER VOLTAGE, VIDEO B+(200V) LINE, 16.5V & 48V LINE
NORMAL
ABNORMAL
CHECK / REPLACE F801 FUSE(T4A 250V)
CHECK / REPLACE I801(STR-S6708) & PERIPHERAL COMPONENT
ABNORMAL
NORMAL
CHECK HORIZONTAL DRIVE PULSE AT PIN 40 OF I501(TDA8842) [REFER TO WAVE FORM §]
CHECK / REPLACE D801(PBS4D8GV-CA) R803(10W 1.0OHM)
CHECK /REPLACE I804(PC817) D812(FML-G16S) R889(2W 56K)
ABNORMAL
NORMAL
CHECK HORIZONTAL Vcc(+8V DC) AT PIN 37 OF I501
CHECK / REPLACE R431 (2W, 2K) R433, 432(2W, 6.8K) Q401 (2SD1207) T401 (HD-15D) Q402 (2SD2499)
ABNORMAL
CHECK POWER SWITCHING VOLTAGE AT PIN 43 OF I701 *POWER ON; HIGH *STAND-BY ; LOW
CHECK / REPLACE I803(KA7808) I810(RQ12RFII)
CHECK SDA(PIN 8) & SCL(PIN7) WAVEFORM OF I501
OK
ABNORMAL
CHECK / REPLACE D813 (FML-16S) D814 (RGP30J) R825 (2W 33) Q802 (KTA 940) I802(PCLDW) T801 (TSM-4445A47)
CHECK / REPLACE I501(TDA8842)
CHECK / REPLACE T402 F.B.T & CRT
NORMAL
ABNORMAL
CHECK VOLTAGE(+5V DC) AT PIN 11 & PIN 37 OF I701
NORMAL
ABNORMAL
CHECK SDA(PIN 3) & SCL(PIN4) WAVEFORM OF I701
OK
NORMAL
CHECK / REPLACE X701(6 MHz, 18MHz)
CHECK / REPLACE I701

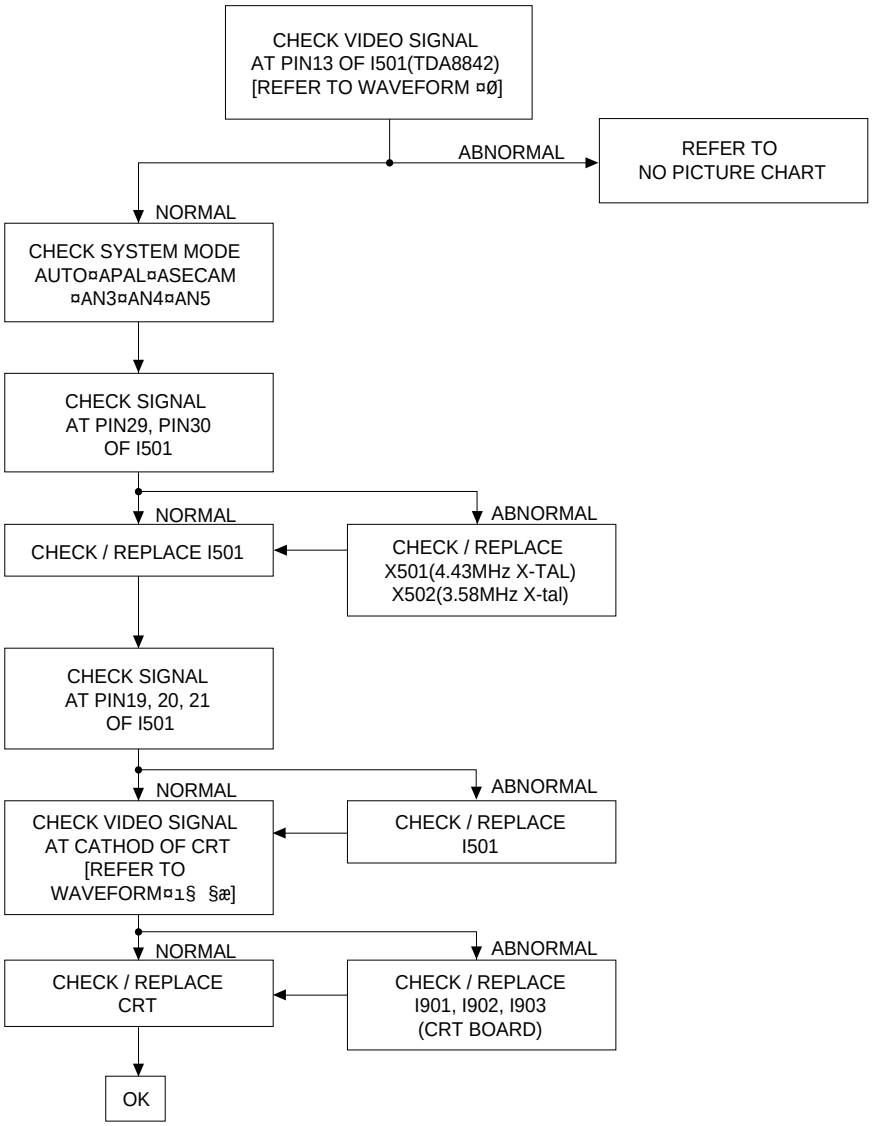
2. NO PICTURE(RASTER OK)



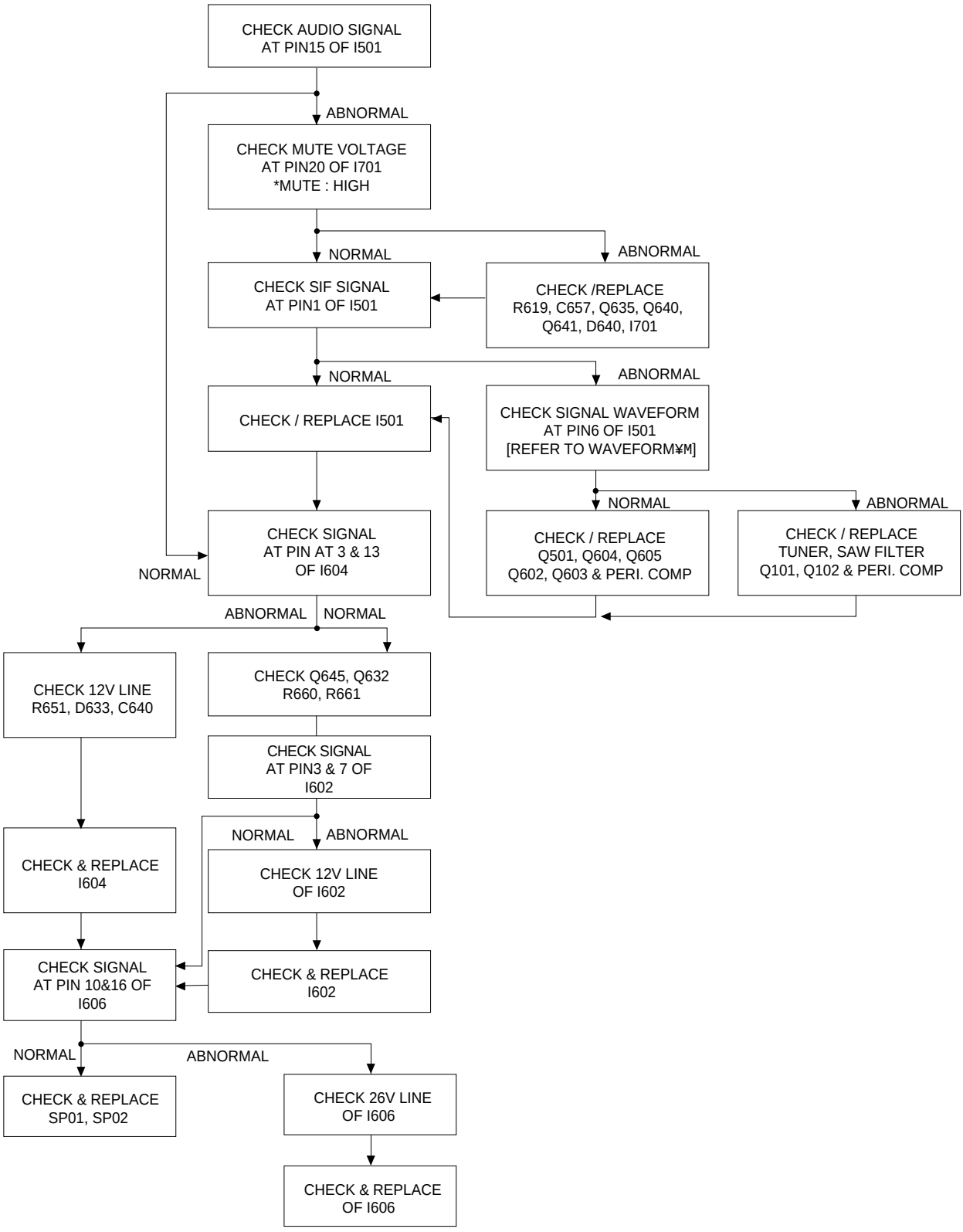
3. NO VERTICAL SCANING(ONE HORIZONTAL LINE ON SCREEN)



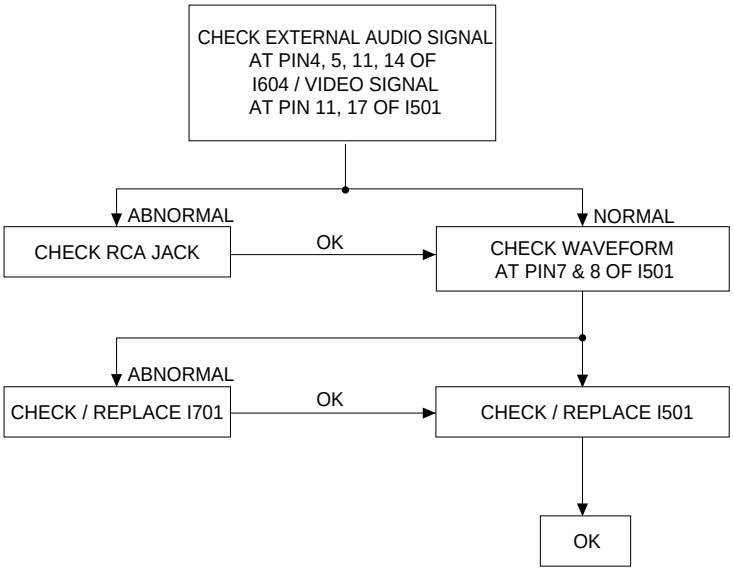
4. NO COLOR


CHECK VIDEO SIGNAL
AT PIN13 OF I501(TDA8842)
[REFER TO WAVEFORM ¤Ø]
ABNORMAL
REFER TO
NO PICTURE CHART
NORMAL
CHECK SYSTEM MODE
AUTO¤APAL¤ASECAM
¤AN3¤AN4¤AN5
CHECK SIGNAL
AT PIN29, PIN30
OF I501
NORMAL
ABNORMAL
CHECK / REPLACE I501
CHECK / REPLACE
X501(4.43MHz X-TAL)
X502(3.58MHz X-tal)
CHECK SIGNAL
AT PIN19, 20, 21
OF I501
NORMAL
ABNORMAL
CHECK VIDEO SIGNAL
AT CATHOD OF CRT
[REFER TO
WAVEFORM¤1§ §æ]
CHECK / REPLACE
I501
NORMAL
ABNORMAL
CHECK / REPLACE
CRT
CHECK / REPLACE
I901, I902, I903
(CRT BOARD)
OK

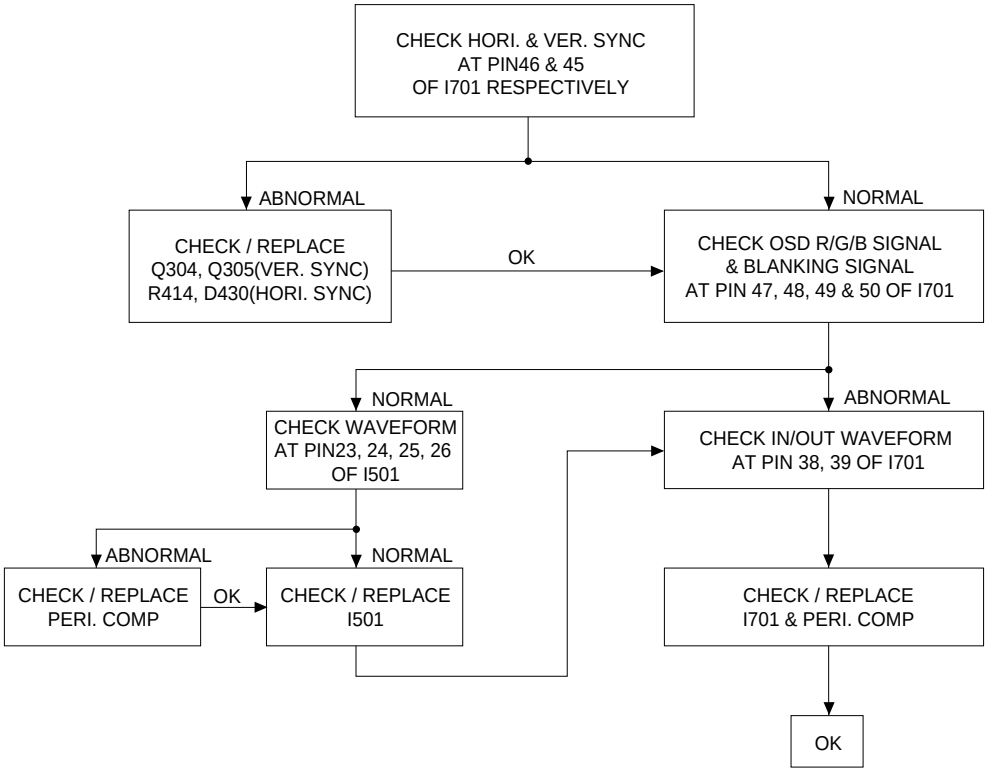
5. NO SOUND(PICTURE OK)


CHECK AUDIO SIGNAL AT PIN15 OF I501
ABNORMAL
CHECK MUTE VOLTAGE AT PIN20 OF I701 *MUTE : HIGH
NORMAL
ABNORMAL
CHECK SIF SIGNAL AT PIN1 OF I501
CHECK /REPLACE R619, C657, Q635, Q640, Q641, D640, I701
NORMAL
ABNORMAL
CHECK / REPLACE I501
CHECK SIGNAL WAVEFORM AT PIN6 OF I501 [REFER TO WAVEFORM¥M]
NORMAL
ABNORMAL
CHECK SIGNAL AT PIN AT 3 & 13 OF I604
CHECK / REPLACE Q501, Q604, Q605 Q602, Q603 & PERI. COMP
CHECK / REPLACE TUNER, SAW FILTER Q101, Q102 & PERI. COMP
NORMAL
ABNORMAL
NORMAL
CHECK 12V LINE R651, D633, C640
CHECK Q645, Q632 R660, R661
CHECK SIGNAL AT PIN3 & 7 OF I602
NORMAL
ABNORMAL
CHECK & REPLACE I604
CHECK 12V LINE OF I602
CHECK SIGNAL AT PIN 10&16 OF I606
CHECK & REPLACE I602
NORMAL
ABNORMAL
CHECK & REPLACE SP01, SP02
CHECK 26V LINE OF I606
CHECK & REPLACE OF I606

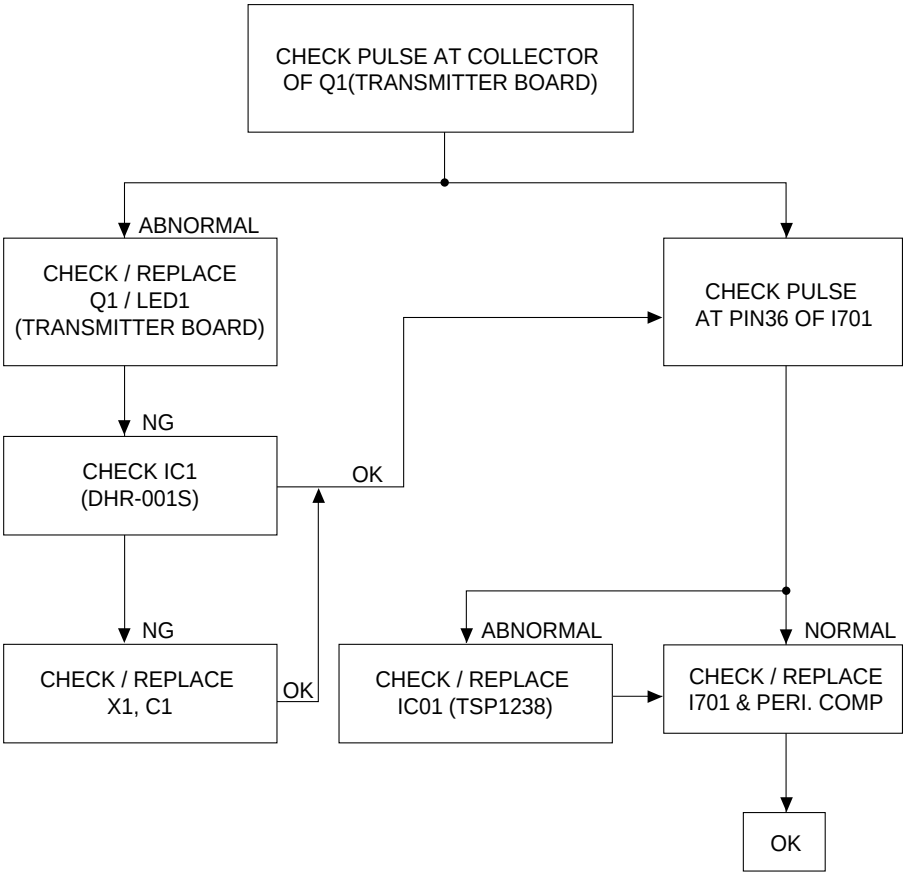
6. NO EXTERNAL A/V(RF OK)



7. NO ON-SCREEN DISPLAY(PICTURE OK)



8. REMOTE CONTROL UNIT TROUBLE(LOCAL CONTROL OK)



■ Electrical Parts List

✔ **Caution**: In this Service Manual, some parts can be changed for improving, their performance without notice in the parts list. So, if you need the latest parts information, please refer to PPL(Parts Price List) in Service information Center(http://svc.dwe.co.kr)

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
ZZ100	48B3228B03	TRANSMITTER REMOCON	R-28B03	
ZZ110	PTACPWD146	ACCESSORY AS	DTR-21D3TMW	
00100	47P7500001	BATTERY	AAM 1.5V	
10000	48586A1617	MANUAL INSTRUCTION	ALL	
M821	4858213800	BAG INSTRUCTION	L.D.P.E T0.05X250X400	
ZZ120	PTBCSHA607	COVER BACK AS	DTR-14D3VG	
M211	4852152321	COVER BACK	HIPS BK	
M541	4855415800	SPEC PLATE	150ART P/E FILM (C/TV)	
ZZ130	PTPKCPA607	PACKING AS	DTR-14D3VG	
M801	4858054300	BOX	SW-2	
M811	4858187901	PAD	EPS 14D3	
M821	4858261100	BAG P.E	LDPE T0.02X1200X1000000	
ZZ131	58G0000084	COIL DEGAUSSING	DC-1450	
ZZ132	48519A4610	CRT GROUND NET	1401H-1015-1P	
ZZ140	PTCACAA609	CABINET AS	DTR-14D3TM	
CRT1	PTRTPWA001	CRT AS	PAL 14' ITC CRT AS	
V01	58D1000046	COIL DY	ODY-M1401	
V02	48A96R004-	RUBBER WEDGE	HMR 28 SR (|0X54)	
V03	4850PM001-	MAGNET CP	NY-225 (MINI NECK)	
V04	2TC26019BE	TAPE CLOTH	19X30 BEIGE	
V05	2224050033	BOND SILICON	RTV 252	
V901	48A96414P1	CRT BARE	A34JLL90X	
M191	4851936901	BUTTON CTRL	4940301+5537001	
M201A	4856013300	SCREW CRT FIXING	30X80 BK	
M201B	4856215402	WASHER RUBBER	CR T2.0	
M201C	4856013301	SCREW CRT FIXING	30X140 YL	
M211A	7122401412	SCREW TAPPING	T2S TRS 4X14 MFZN BK	
M211B	7128301212	SCREW TAPPING	T2S WAS 3X12 MFZN BK	
M481	4854854201	BUTTON POWER	ABS BK	
M481A	4856716000	SPRING	SWPA PIE0.5	
M561	48556136SS	MARK BRAND	SILVER ETCHING DIA-CUTTIN	
PA601	4850704S25	CONNECTOR	YH025-04+35098+ULW=300	
PA602	4850703S54	CONNECTOR	YH025-03+35098+ULW=600	
SP01A	7128301011	SCREW TAPPING	T2S WAS 3X10 MFZN	
SP02	48A8305400	SPEAKER SYSTEM	SS-5090F01 7.5W 4 OHM	
SP02A	7128301011	SCREW TAPPING	T2S WAS 3X10 MFZN	
ZZ200	PTFMSJA607	MASK FRONT AS	DTR-14D3VG	
M201	4852068511	MASK FRONT	HIPS BK	
M251	4852535810	GRILL L	SECC T0.5 14D3 L	
M252	4852535910	GRILL R	SECC T0.5 14D3 R	
ZZ290	PTMPMSA609	PCB MAIN MANUAL AS	DTR-14D3TM	
00001	T2SD2499—	TR	2SD2499	
0000A	4857027200	HEAT SINK	AL T1.0	
0000B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN	
C101	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)	
C102	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C103	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C104	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP	
C105	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP	
C106	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C107	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP	
C108	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C109	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C110	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C111	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)	
C112	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C113	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C114	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)	
C115	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C116	CMXM2A223J	C MYLAR	100V 0.022MF J TP	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
C117	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)	
C119	CMXM2A473J	C MYLAR	100V 0.047MF J (TP)	
C199	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C301	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)	
C302	CCZB1H181K	C CERA	50V B 180PF K (AXIAL)	
C303	CCZB1H181K	C CERA	50V B 180PF K (AXIAL)	
C304	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)	
C306	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z	
C308	CEXF1V471C	C ELECTRO	35V RUS 470MF (10X20) TP	
C311	CMXM2A223J	C MYLAR	100V 0.022MF J TP	
C312	CMXM2A103J	C MYLAR	100V 0.01MF J (TP)	
C401	CBZR1C472M	C CERA	16V Y5R 4700PF M (AXIAL)	
C402	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C403	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C404	CCZB1H151K	C CERA	50V B 150PF K (AXIAL)	
C405	CMXM2A223J	C MYLAR	100V 0.022MF J TP	
C406	CCXB2H102K	C CERA	500V B 1000PF K (TAPPING)	
C409	CCXB3D221K	C CERA	2KV B 220PF K (TAPPING)	
C410	CMYH3C692J	C MYLAR	1.6KV BUP 6900PF J	
C411	CMYE2D334J	C MYLAR	200V PU 0.33MF J	
C412	CEXF2C339C	C ELECTRO	160V RUS 3.3MF (8X16) TP	
C413	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C414	CCXB2H471K	C CERA	500V B 470PF K (TAPPING)	
C415	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)	
C416	CCXB2H471K	C CERA	500V B 470PF K (TAPPING)	
C417	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP	
C418	CMXM2A223J	C MYLAR	100V 0.022MF J TP	
C419	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C420	CXSL2H470J	C CERA	500V SL 47PF J (TAPPING)	
C422	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z	
C423	CCXB2H102K	C CERA	500V B 1000PF K (TAPPING)	
C428	CEXF2C470V	C ELECTRO	160V RSS 47MF (13X25) TP	
C429	CCXF2H103Z	C CERA	HIKF 500V 0.01MF Z	
C501	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z	
C502	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP	
C503	CMXM2A223J	C MYLAR	100V 0.022MF J TP	
C504	CMXM2A223J	C MYLAR	100V 0.022MF J TP	
C505	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C506	CMXM2A473J	C MYLAR	100V 0.047MF J (TP)	
C508	CMXM2A473J	C MYLAR	100V 0.047MF J (TP)	
C509	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C510	CMXM2A473J	C MYLAR	100V 0.047MF J (TP)	
C512	CEXF1H108V	C ELECTRO	50V RSS 0.1MF (5X11) TP	
C513	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z	
C515	CZCH1H180J	C CERA	50V CH 18PF J (AXIAL)	
C516	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z	
C517	CBZR1C472M	C CERA	16V Y5R 4700PF M (AXIAL)	
C518	CZCH1H180J	C CERA	50V CH 18PF J (AXIAL)	
C530	CEXF1H228V	C ELECTRO	50V RSS 0.22MF (5X11) TP	
C544	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C601	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)	
C602	CCZB1H181K	C CERA	50V B 180PF K (AXIAL)	
C605	CZSL1H560J	C CERA	50V SL 56PF J (AXIAL)	
C606	CZSL1H680J	C CERA	50V SL 68PF J (AXIAL)	
C610	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z	
C611	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C619	CBZR1C562M	C CERA	16V Y5R 5600PF M (AXIAL)	
C631	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP	
C632	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP	
C634	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
C635	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP	
C636	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP	
C638	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C639	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C640	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C641	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C642	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C643	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C644	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C645	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C646	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C647	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C648	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP	
C649	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5X11) TP	
C650	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP	
C651	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP	
C652	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C653	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP	
C654	CMXM2A223J	C MYLAR	100V 0.022MF J TP	
C655	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)	
C656	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C657	CEXF1H220V	C ELECTRO	50V RSS 22MF (5X11) TP	
C658	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C659	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C660	CMXM2A153J	C MYLAR	100V 0.015MF J (TP)	
C661	CMXM2A153J	C MYLAR	100V 0.015MF J (TP)	
C662	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C663	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C664	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C665	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C666	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C667	CMXM2A153J	C MYLAR	100V 0.015MF J (TP)	
C668	CEXF1V102V	C ELECTRO	35V RSS 1000MF (13X25) TP	
C669	CEXF1V102V	C ELECTRO	35V RSS 1000MF (13X25) TP	
C670	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)	
C671	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C672	CEXF1V102V	C ELECTRO	35V RSS 1000MF (13X25) TP	
C673	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C675	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)	
C676	CEXF1V102V	C ELECTRO	35V RSS 1000MF (13X25) TP	
C677	CMXM2A104J	C MYLAR	100V 0.1MF J (TP)	
C701	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C702	CEXF1C102V	C ELECTRO	16V RSS 1000MF (10X20) TP	
C703	CZSL1H220J	C CERA	50V SL 22PF J (AXIAL)	
C704	CZSL1H220J	C CERA	50V SL 22PF J (AXIAL)	
C705	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C709	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)	
C710	CMXB1H104J	C MYLAR	50V EU 0.1MF J (TP)	
C711	CMXB1H104J	C MYLAR	50V EU 0.1MF J (TP)	
C712	CEXF1H470V	C ELECTRO	50V RSS 47MF (6.3X11) TP	
C713	CCXF1H103Z	C CERA	50V F 0.01MF Z (TAPPING)	
C714	CMXB1H333J	C MYLAR	50V EU 0.033MF J (TP)	
C715	CMXL1J224J	C MYLAR	63V MEU 0.22MF J (TP)	
C716	CMXB1H333J	C MYLAR	50V EU 0.033MF J (TP)	
C717	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C718	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C719	CMXL1J334J	C MYLAR	63V MEU 0.33MF J (TP)	
C720	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C721	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C722	CZSL1H390J	C CERA	50V SL 39PF J (AXIAL)	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
C723	CZSL1H360J	C CERA	50V SL 36PF J (AXIAL)	
C724	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C725	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP	
C730	CCZB1H561K	C CERA	50V B 560PF K	
C731	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)	
C732	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)	
C733	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)	
C740	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP	
C741	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP	
C801	CL1JB3104M	C LINE ACROSS	AC250V 0.1MF M ECQ-UV WRL	
C802	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)	
C803	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)	
C804	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)	
C805	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)	
C807	CEYN2W221P	C ELECTRO	450V LHS 220MF (30X40)	
C808	CEXF1E221V	C ELECTRO	25V RSS 220MF (8X11.5) TP	
C809	CEXF1E221V	C ELECTRO	25V RSS 220MF (8X11.5) TP	
C811	CMXH3C152J	C MYLAR	1.6KV BUP 1500PF J (TP)	
C812	CEXF2A100C	C ELECTRO	RUS 100V 10MF 5*11	
C813	CCXB1H102K	C CERA	50V B 1000PF K (TAPPING)	
C817	CCXB2H471K	C CERA	500V B 470PF K (TAPPING)	
C818	CEYF2C221C	C ELECTRO	160V RUS 220MF (18X35.5)	
C819	CEXF2C101C	C ELECTRO	160V RUS 100MF (16X25) TP	
C820	CCXB2H102K	C CERA	500V B 1000PF K (TAPPING)	
C821	CEYF1H222V	C ELECTRO	50V RSS 2200MF (18X35.5)	
C822	CCXB2H471K	C CERA	500V B 470PF K (TAPPING)	
C823	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP	
C825	CEXF1E471V	C ELECTRO	25V RSS 470MF (10X16) TP	
C826	CEXF1E471V	C ELECTRO	25V RSS 470MF (10X16) TP	
C829	CCZF1E103Z	C CERA	25V F 0.01MF Z (AXIAL)	
C830	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
C831	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z	
C832	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z	
C833	CMXL1J334J	C MYLAR	63V MEU 0.33MF J (TP)	
C834	CEXF1E221C	C ELECTRO	25V RUS 220MF (8X11.5) TP	
C840	CEXF2C470V	C ELECTRO	160V RSS 47MF (13X25) TP	
C841	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP	
C842	CCXB2H102K	C CERA	500V B 1000PF K (TAPPING)	
C899	CH1BFE472M	C CERA AC	AC400V 4700PF M U/C/V	
CA03	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z	
CC01	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP	
D102	D1N4148—	DIODE	1N4148 (TAPPING)	
D103	D1SS85TA—	DIODE	1SS85TA	
D301	DMTZJ5R1A-	DIODE ZENER	MTZJ 5.1A (TAPPING)	
D401	DRGP15J—	DIODE	RGP15J	
D402	DRGP15J—	DIODE	RGP15J	
D403	DRGP15J—	DIODE	RGP15J	
D404	D1N4148—	DIODE	1N4148 (TAPPING)	
D405	D1N4148—	DIODE	1N4148 (TAPPING)	
D406	D1N4148—	DIODE	1N4148 (TAPPING)	
D409	DRGP15J—	DIODE	RGP15J	
D430	DMTZJ5R1A-	DIODE ZENER	MTZJ 5.1A (TAPPING)	
D502	D1N4148—	DIODE	1N4148 (TAPPING)	
D503	D1N4148—	DIODE	1N4148 (TAPPING)	
D504	D1N4148—	DIODE	1N4148 (TAPPING)	
D505	D1N4148—	DIODE	1N4148 (TAPPING)	
D601	D1SS85TA—	DIODE	1SS85TA	
D602	D1N4148—	DIODE	1N4148 (TAPPING)	
D603	D1N4148—	DIODE	1N4148 (TAPPING)	
D604	D1N4148—	DIODE	1N4148 (TAPPING)	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
D633	DMTZJ6R8B-	DIODE ZENER	MTZJ 6.8B (TAPPING)	
D634	DMTZJ5R6B-	DIODE ZENER	MTZJ 5.6B (TAPPING)	
D635	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
D636	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
D640	DMTZJ10B—	DIODE ZENER	MTZJ 10B (TAPPING)	
D701	D1N4148—-	DIODE	1N4148 (TAPPING)	
D702	D1N4148—-	DIODE	1N4148 (TAPPING)	
D703	D1N4148—-	DIODE	1N4148 (TAPPING)	
D704	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
D705	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
D710	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
D711	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
D801	DPBS408GU-	DIODE BRIDGE	PBS408GU-CA	
D802	D1S1888—-	DIODE	1S1888 (TAPPING)	
D803	DRGP15J—-	DIODE	RGP15J	
D804	DRGP15J—-	DIODE	RGP15J	
D805	DRGP15J—-	DIODE	RGP15J	
D806	DRGP15J—-	DIODE	RGP15J	
D807	DUZ7R5BM—	DIODE ZENER	UZ-7.5BM 7.5V	
D808	DRGP15J—-	DIODE	RGP15J	
D809	DRGP15J—-	DIODE	RGP15J	
D812	DFMLG16S—	DIODE	FML-G16S	
D813	DFMLG16S—	DIODE	FML-G16S	
D814	DRGP30J—-	DIODE	RGP30J	
D821	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
D831	DRGP15J—-	DIODE	RGP15J	
DA01	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
DA02	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
DA03	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
DA04	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
DA07	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
DA08	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
DC01	DKLR114L—	LED	KLR114L	
DC02	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
DC03	DUZ9R1BM—	DIODE ZENER	UZ-9.1BM 9.1V	
EP01	4859102130	JACK EARPHONE	YSC-1537	
F801	5FKGB4022R	FUSE GLASS TUBE	KS MF51 4A 250V NR	
F801A	4857415001	CLIP FUSE	PFC5000-0702	
F801B	4857415001	CLIP FUSE	PFC5000-0702	
I301	PTA2SW7717	HEAT SINK ASS`Y	1TDA8356— + 7174301011	
I301	1TDA8356—	IC VERTICAL	TDA8356	
I301A	4857027717	HEAT SINK	AL EX	
I301B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN	
I501	1TDA8842N2	IC VIDEO	TDA8842/N2	
I602	1UPC1406HA	IC	UPC 1406HA	
I604	1TC4052BP-	IC	TC4052BP	
I606	PTB2SW7524	HEAT SINK ASS`Y	1TA8218AH- + 7174301211	
I606	1TA8218AH-	IC AUDIO AMP	TA8218AH	
I606A	4857027524	HEAT SINK	AL EX	
I606B	7174301211	SCREW TAPPTITE	TT2 RND 3X12 MFZN	
I701	1DW5255MB1	IC MICOM	DW5255MB1	
I702	1AT24C08PC	IC	AT24C08-10PC	
I703	1UPC574J—	IC	UPC574J	
I801	PTA2SW7901	HEAT SINK ASS`Y	1STRS6708- + 7174301211	
I801	1STRS6708-	IC POWER	STR-S6708	
I801A	4857027901	HEAT SINK	AL EX	
I801B	7174301211	SCREW TAPPTITE	TT2 RND 3X12 MFZN	
I802	1PCLDW——	IC HYBRID	PCLDW	
I803	1KA7808—-	IC REGULATOR	KA7808	
I804	1LTV817C—	IC PHOTO COUPLER	LTV-817C	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
I806	1PQ5RS1A—	IC REGULATOR	PQ5RS1A	
I808	1SE125N—-	IC	SE125N	
I810	PTT2SW6900	HEAT SINK ASS`Y	1PQ12RF11- + 7174300811	
I810	1PQ12RF11-	IC REGULATOR	PQ12RF11	
I810A	4857026900	HEAT SINK	AL EX	
I810B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN	
IC01	1TS0P1238W	IC PREAMP	TS0P1238WI1	
J001~J06	785801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
J068	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
J069	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
J070~J09	485801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
J096~J18	085801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
JV01	4859200401	SOCKET RGB	YRS21-R1	
JV02	4859108450	JACK PIN BOARD	YSC03P-4120-14A	
JV03	4859107050	JACK PIN BOARD	PH-JB-9601 (PH06P-4120-C)	
L101	5CPZ100K04	COIL PEAKING	10UH 10.5MM K (LAL04TB)	
L102	58C9780027	COIL CHOKE	TRF-1201B (0.97 UH)	
L401	5CPZ109M02	COIL PEAKING	1UH M (AXIAL 3.5MM)	
L405	58H0000016	COIL H-LINEARITY	L-102 (102UH)	
L501	5CPZ829K02	COIL PEAKING	8.2UH K (AXIAL 3.5MM)	
L502	5CPZ689K02	COIL PEAKING	6.8UH K (AXIAL 3.5MM)	
L603	58CX430599	COIL CHOKE	AZ-9004Y 940K TP	
L604	5CPZ829K02	COIL PEAKING	8.2UH K (AXIAL 3.5MM)	
L701	5CPZ689K02	COIL PEAKING	6.8UH K (AXIAL 3.5MM)	
L702	5CPZ100K02	COIL PEAKING	10UH K (AXIAL 3.5MM)	
L801	5PLF20A1—	FILTER LINE	LF-20A1	
L803	5MC0000100	COIL BEAD	HC-3550	
L804	5MC0000100	COIL BEAD	HC-3550	
L805	58CX430599	COIL CHOKE	AZ-9004Y 940K TP	
M353	4853530901	HOLDER LED	P.P	
M682	4856812001	TIE CABLE	NYLON66 DA100	
M683	4856814900	CLAMP WIRE	NYLON 66	
P102	485923162S	CONN WAFER	YW025-03 (STICK)	
P401	4859240020	CONN WAFER	YFW500-05	
P501	485923192S	CONN WAFER	YW025-06 (STICK)	
P502	485923182S	CONN WAFER	YW025-05 (STICK)	
P601	485923172S	CONN WAFER	YW025-04 (STICK)	
P602	485923162S	CONN WAFER	YW025-03 (STICK)	
P605A	4850705S03	CONNECTOR	YH025-05+YST025+ULW=300	
P605B	485923182S	CONN WAFER	YW025-05 (STICK)	
P801	4859242220	CONN WAFER	YFW800-02	
P802	4859242220	CONN WAFER	YFW800-02	
PW000	4859901111	CORD POWER	KKP-419C KLCE-2F (2.1ME)	
PWC1	PTWASW2910	CORD POWER ASS`Y	4859901111+ HOUSING	
Q101	TKTC3197—	TR	KTC3197 (TP)	
Q102	TKTC3198Y-	TR	KTC3198Y	
Q303	TKTC3198Y-	TR	KTC3198Y	
Q304	TKTC3198Y-	TR	KTC3198Y	
Q305	TKTC3198Y-	TR	KTC3198Y	
Q401	T2SD1207T-	TR	2SD1207-T (TAPPING)	
Q402	PTG2SW7200	HEAT SINK ASS`Y	T2SD2499— + 7174300811	
Q501	TKTC3198Y-	TR	KTC3198Y	
Q503	TKTC3198Y-	TR	KTC3198Y	
Q504	TKTA1266Y-	TR	KTA1266Y (TP)	
Q505	TKTC3198Y-	TR	KTC3198Y	
Q506	TKTC3198Y-	TR	KTC3198Y	
Q507	TKTC3198Y-	TR	KTC3198Y	
Q603	TKTC3198Y-	TR	KTC3198Y	
Q604	TKTC3198Y-	TR	KTC3198Y	
Q605	TKTC3198Y-	TR	KTC3198Y	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
Q631	TKTC3198Y-	TR	KTC3198Y	
Q632	TKTC3198Y-	TR	KTC3198Y	
Q633	TKTC3198Y-	TR	KTC3198Y	
Q635	TKTC3198Y-	TR	KTC3198Y	
Q640	TKTC3198Y-	TR	KTC3198Y	
Q641	TKTC3198Y-	TR	KTC3198Y	
Q645	TKTC3198Y-	TR	KTC3198Y	
Q701	TKTC3198Y-	TR	KTC3198Y	
Q702	TKTC3198Y-	TR	KTC3198Y	
Q705	TKTC3198Y-	TR	KTC3198Y	
Q706	TKTC3198Y-	TR	KTC3198Y	
Q707	TKTC3198Y-	TR	KTC3198Y	
Q708	TKTA1266Y-	TR	KTA1266Y (TP)	
Q709	TKTA1266Y-	TR	KTA1266Y (TP)	
Q710	TKTA1266Y-	TR	KTA1266Y (TP)	
Q711	TKTC3198Y-	TR	KTC3198Y	
Q713	TKTC3198Y-	TR	KTC3198Y	
Q714	TKTC3198Y-	TR	KTC3198Y	
Q801	T2SC4793—	TR	2SC4793	
Q802	TKTA1659Y-	TR	KTA 1659-Y	
R101	RD-AZ470J-	R CARBON FILM	1/6 47 OHM J	
R102	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R103	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J	
R104	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J	
R105	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R106	RD-AZ123J-	R CARBON FILM	1/6 12K OHM J	
R107	RD-AZ243J-	R CARBON FILM	1/6 24K OHM J	
R108	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J	
R109	RD-AZ183J-	R CARBON FILM	1/6 18K OHM J	
R110	RD-AZ391J-	R CARBON FILM	1/6 390 OHM J	
R111	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J	
R112	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J	
R113	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J	
R114	RD-AZ563J-	R CARBON FILM	1/6 56K OHM J	
R115	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J	
R116	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J	
R301	RN-AZ3902F	R METAL FILM	1/6 39K OHM F	
R302	RN-AZ1501F	R METAL FILM	1/6 1.5K OHM F	
R303	RS01Z153J-	R M-OXIDE FILM	1W 15K OHM J (TAPPING)	
R304	RD-4Z189J-	R CARBON FILM	1/4 1.8 OHM J	
R305	RD-4Z189J-	R CARBON FILM	1/4 1.8 OHM J	
R307	RS02Z271J-	R M-OXIDE FILM	2W 270 OHM J (TAPPING)	
R310	RD-4Z472J-	R CARBON FILM	1/4 4.7K OHM J	
R314	RD-4Z223J-	R CARBON FILM	1/4 22K OHM J	
R320	RD-AZ302J-	R CARBON FILM	1/6 3K OHM J	
R321	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R322	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R323	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R324	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R401	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R402	RD-AZ153J-	R CARBON FILM	1/6 15K OHM J	
R403	RD-AZ479J-	R CARBON FILM	1/6 4.7 OHM J	
R404	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R405	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J	
R406	RD-4Z562J-	R CARBON FILM	1/4 5.6K OHM J	
R407	RD-AZ752J-	R CARBON FILM	1/6 7.5K OHM J	
R408	RS02Z561JS	R M-OXIDE FILM	2W 560 OHM J SMALL	
R409	RS02Z103JS	R M-OXIDE FILM	2W 10K OHM J SMALL	
R411	RS01Z109J-	R M-OXIDE FILM	1W 1 OHM J (TAPPING)	
R412	RS01Z109J-	R M-OXIDE FILM	1W 1 OHM J (TAPPING)	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
R413	RS01Z109J-	R M-OXIDE FILM	1W 1 OHM J (TAPPING)	
R414	RD-2Z273J-	R CARBON FILM	1/2 27K OHM J	
R415	RS02Z209JS	R M-OXIDE FILM	2W 2 OHM J SMALL	
R416	RD-AZ303J-	R CARBON FILM	1/6 30K OHM J	
R417	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J	
R418	RD-AZ393J-	R CARBON FILM	1/6 39K OHM J	
R422	RD-4Z273J-	R CARBON FILM	1/4 27K OHM J	
R431	RS02Z202JS	R M-OXIDE FILM	2W 2K OHM J SMALL	
R432	RS02Z682JS	R M-OXIDE FILM	2W 6.8K OHM J SMALL	
R433	RS02Z682JS	R M-OXIDE FILM	2W 6.8K OHM J SMALL	
R501	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R502	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R503	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R504	RD-AZ181J-	R CARBON FILM	1/6 180 OHM J	
R505	RD-AZ479J-	R CARBON FILM	1/6 4.7 OHM J	
R507	RD-4Z109J-	R CARBON FILM	1/4 1 OHM J	
R508	RD-AZ301J-	R CARBON FILM	1/6 300 OHM J	
R511	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R512	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R513	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R514	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J	
R516	RD-AZ564J-	R CARBON FILM	1/6 560K OHM J	
R517	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J	
R518	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R519	RD-AZ470J-	R CARBON FILM	1/6 47 OHM J	
R521	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J	
R522	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
R524	RD-AZ303J-	R CARBON FILM	1/6 30K OHM J	
R527	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R528	RD-AZ182J-	R CARBON FILM	1/6 1.8K OHM J	
R529	RD-AZ751J-	R CARBON FILM	1/6 750 OHM J	
R530	RD-AZ203J-	R CARBON FILM	1/6 20K OHM J	
R531	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J	
R532	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J	
R533	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R534	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R535	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R536	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R537	RD-AZ121J-	R CARBON FILM	1/6 120 OHM J	
R538	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R539	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R540	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R541	RD-AZ333J-	R CARBON FILM	1/6 33K OHM J	
R542	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J	
R601	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J	
R602	RD-AZ561J-	R CARBON FILM	1/6 560 OHM J	
R603	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J	
R604	RD-AZ681J-	R CARBON FILM	1/6 680 OHM J	
R605	RD-AZ270J-	R CARBON FILM	1/6 27 OHM J	
R606	RD-AZ391J-	R CARBON FILM	1/6 390 OHM J	
R607	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R608	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R609	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R610	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R611	RD-AZ203J-	R CARBON FILM	1/6 20K OHM J	
R612	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J	
R613	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J	
R614	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J	
R615	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R618	RD-AZ912J-	R CARBON FILM	1/6 9.1K OHM J	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
R619	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R623	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J	
R624	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R631	RD-AZ224J-	R CARBON FILM	1/6 220K OHM J	
R632	RD-AZ224J-	R CARBON FILM	1/6 220K OHM J	
R633	RD-AZ224J-	R CARBON FILM	1/6 220K OHM J	
R634	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J	
R635	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J	
R636	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
R637	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R638	RD-AZ224J-	R CARBON FILM	1/6 220K OHM J	
R639	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J	
R640	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J	
R641	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R642	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J	
R647	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J	
R648	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J	
R649	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R650	RD-AZ224J-	R CARBON FILM	1/6 220K OHM J	
R651	RD-4Z181J-	R CARBON FILM	1/4 180 OHM J	
R652	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R653	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R654	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R655	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R656	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R657	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R658	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R659	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R660	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J	
R661	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J	
R662	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R663	RD-AZ224J-	R CARBON FILM	1/6 220K OHM J	
R664	RD-AZ242J-	R CARBON FILM	1/6 2.4K OHM J	
R665	RD-AZ242J-	R CARBON FILM	1/6 2.4K OHM J	
R666	RD-AZ303J-	R CARBON FILM	1/6 30K OHM J	
R667	RD-AZ242J-	R CARBON FILM	1/6 2.4K OHM J	
R670	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R671	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R672	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R673	RD-AZ152J-	R CARBON FILM	1/6 1.5K OHM J	
R674	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J	
R675	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J	
R676	RD-AZ183J-	R CARBON FILM	1/6 18K OHM J	
R677	RD-AZ183J-	R CARBON FILM	1/6 18K OHM J	
R678	RD-AZ392J-	R CARBON FILM	1/6 3.9K OHM J	
R679	RD-AZ182J-	R CARBON FILM	1/6 1.8K OHM J	
R680	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J	
R681	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R682	RN-AZ6800F	R METAL FILM	1/6 680 OHM F	
R683	RN-AZ1801F	R METAL FILM	1/6 1.8K OHM F	
R684	RN-AZ6800F	R METAL FILM	1/6 680 OHM F	
R685	RD-4Z229J-	R CARBON FILM	1/4 2.2 OHM J	
R686	RD-4Z471J-	R CARBON FILM	1/4 470 OHM J	
R687	RD-4Z229J-	R CARBON FILM	1/4 2.2 OHM J	
R688	RD-4Z229J-	R CARBON FILM	1/4 2.2 OHM J	
R690	RD-2Z271J-	R CARBON FILM	1/2 270 OHM J	
R691	RD-2Z271J-	R CARBON FILM	1/2 270 OHM J	
R692	RD-AZ224J-	R CARBON FILM	1/6 220K OHM J	
R693	RD-AZ153J-	R CARBON FILM	1/6 15K OHM J	
R695	RD-4Z223J-	R CARBON FILM	1/4 22K OHM J	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
R696	RD-2Z152J-	R CARBON FILM	1/2 1.5K OHM J	
R697	RD-4Z471J-	R CARBON FILM	1/4 470 OHM J	
R701	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J	
R702	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J	
R703	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J	
R705	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R706	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R707	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R709	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R710	RD-4Z109J-	R CARBON FILM	1/4 1 OHM J	
R711	RD-AZ912J-	R CARBON FILM	1/6 9.1K OHM J	
R716	RD-AZ823J-	R CARBON FILM	1/6 82K OHM J	
R717	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R718	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R719	RD-4Z103J-	R CARBON FILM	1/4 10K OHM J	
R720	RS02Z562JS	R M-OXIDE FILM	2W 5.6K OHM J SMALL	
R721	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J	
R722	RD-AZ822J-	R CARBON FILM	1/6 8.2K OHM J	
R723	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J	
R724	RD-AZ100J-	R CARBON FILM	1/6 10 OHM J	
R725	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J	
R726	RS02Z562JS	R M-OXIDE FILM	2W 5.6K OHM J SMALL	
R727	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R728	RD-4Z100J-	R CARBON FILM	1/4 10 OHM J	
R729	RD-AZ333J-	R CARBON FILM	1/6 33K OHM J	
R730	RD-AZ333J-	R CARBON FILM	1/6 33K OHM J	
R731	RD-AZ333J-	R CARBON FILM	1/6 33K OHM J	
R732	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R733	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R734	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R735	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R736	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R737	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R738	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R739	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R740	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R743	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R744	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R745	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R750	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R751	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J	
R753	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J	
R756	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R757	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R758	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
R759	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R760	RD-AZ513J-	R CARBON FILM	1/6 51K OHM J	
R761	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J	
R762	RD-AZ513J-	R CARBON FILM	1/6 51K OHM J	
R763	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R764	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
R766	RD-AZ333J-	R CARBON FILM	1/6 33K OHM J	
R768	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R769	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R770	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R779	RD-AZ242J-	R CARBON FILM	1/6 2.4K OHM J	
R780	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R781	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R782	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R801	DEC140M290	POSISTOR	ECPCC140M290	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
R803	RX10B109JN	R CEMENT	10W 1 OHM J BENCH 4P	
R804	RS02Z153J-	R M-OXIDE FILM	2W 15K OHM J (TAPPING)	
R805	RS02Z153J-	R M-OXIDE FILM	2W 15K OHM J (TAPPING)	
R808	RS02Z160JS	R M-OXIDE FILM	2W 16 OHM J SMALL	
R809	RS01Z109J-	R M-OXIDE FILM	1W 1 OHM J (TAPPING)	
R810	RS01Z688J-	R M-OXIDE FILM	1W 0.68 OHM J	
R811	RD-4Z330J-	R CARBON FILM	1/4 33 OHM J	
R812	RD-4Z912J-	R CARBON FILM	1/4 9.1K OHM J	
R813	RD-4Z202J-	R CARBON FILM	1/4 2K OHM J	
R814	RD-4Z272J-	R CARBON FILM	1/4 2.7K OHM J	
R815	RD-4Z101J-	R CARBON FILM	1/4 100 OHM J	
R816	RF02Z188J-	R FUSIBLE	2W 0.18 OHM J (TAPPING)	
R817	RD-4Z182J-	R CARBON FILM	1/4 1.8K OHM J	
R818	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J	
R819	RD-4Z472J-	R CARBON FILM	1/4 4.7K OHM J	
R820	RD-4Z153J-	R CARBON FILM	1/4 15K OHM J	
R821	RS02Z109JS	R M-OXIDE FILM	2W 1 OHM J SMALL	
R824	RS02Z229JS	R M-OXIDE FILM	2W 2.2 OHM J SMALL	
R825	RS02Z330J-	R M-OXIDE FILM	2W 33 OHM J (TAPPING)	
R826	RS02Z470JS	R M-OXIDE FILM	2W 47 OHM J SMALL	
R830	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J	
R831	RD-4Z472J-	R CARBON FILM	1/4 4.7K OHM J	
R832	RD-4Z472J-	R CARBON FILM	1/4 4.7K OHM J	
R833	RD-4Z473J-	R CARBON FILM	1/4 47K OHM J	
R835	RS01Z228J-	R M-OXIDE FILM	1W 0.22 OHM J	
R889	RS02Z563JS	R M-OXIDE FILM	2W 56K OHM J SMALL	
R899	RC-2Z565KP	R CARBON COMP	1/2 5.6M OHM K	
RC01	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J	
RC02	RD-AZ152J-	R CARBON FILM	1/6 1.5K OHM J	
RC03	RD-AZ202J-	R CARBON FILM	1/6 2K OHM J	
RC04	RD-AZ362J-	R CARBON FILM	1/6 3.6K OHM J	
RC05	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
RC06	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J	
RC07	RD-4Z301J-	R CARBON FILM	1/4 300 OHM J	
SF101	5PK6259K—	FILTER SAW	K6259K	
SW01	5S50101090	SW TACT	SKHV17910A	
SW02	5S50101090	SW TACT	SKHV17910A	
SW03	5S50101090	SW TACT	SKHV17910A	
SW04	5S50101090	SW TACT	SKHV17910A	
SW05	5S50101090	SW TACT	SKHV17910A	
SW06	5S50101090	SW TACT	SKHV17910A	
SW801	5S40101143	SW POWER PUSH	PS3-22SP (P.C.B)	
T401	50D0000022	TRANS DRIVE	HD-15D	
T402	50H0000190	FBT	FSA36012M	
T801	50M4445A7-	TRANS SMPS	TSM-4445A7	
TU01	4859717930	TUNER VARACTOR	DT2-BV12D	
X501	5XE4R4336E	CRYSTAL QUARTZ	HC-49/U 4.433619MHZ 30PPM	
X502	5XEX3R579C	CRYSTAL QUARTZ	HC-49U 3.579545M (TP)	
X701	5XE18R000E	CRYSTAL QUARTZ	HC-49/U 18.000MHZ 30PPM	
Z501	5PTPS45MB-	FILTER CERA	TPS-4.5MB(TRAP)	
Z502	5PXPS5R5MB	FILTER CERA	TPS5.5MB-TF21 (TP)	

LOC	PART-CODE	PART-NAME	PART TYPE	REMARK
Z503	5PTPS60MB-	FILTER CERA	TPS 6.0MB(EFC-S6ROME3)	
Z504	5PTPS65MB-	FILTER CERA	TPS 6.5MB(EFC-S6R5ME3)	
Z601	5PXFSH5R5M	FILTER CERA	SFSH5.5MCB-TF21 (TP)	
Z602	5PXFSH6R5M	FILTER CERA	SFSH6.5MCB-TF21 (TP)	
Z603	5PSFE45MB-	FILTER CERA	SFE 4.5MB	
Z604	5PXFSH6R0M	FILTER CERA	SFSH6.0MCB-TF21 (TP)	
Z801	DSVC471D14	VARISTOR	SVC471D14A	
ZZ300	PTCPMSA607	PCB CRT MANUAL AS	DTR-14D3VG	
C904	CMXL2E104K	C MYLAR	250V MEU 0.1MF K	
C905	CMXL2E104K	C MYLAR	250V MEU 0.1MF K	
C906	CMXL2E104K	C MYLAR	250V MEU 0.1MF K	
C907	CCXB1H561K	C CERA	50V B 560PF K (TAPPING)	
C908	CCXB1H561K	C CERA	50V B 560PF K (TAPPING)	
C909	CCXB1H561K	C CERA	50V B 560PF K (TAPPING)	
C911	CCYB3D472K	C CERA	2KV B 4700PF K	
C912	CEXF1E221V	C ELECTRO	25V RSS 220MF (8X11.5) TP	
C913	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
C914	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP	
D901	D1N4148—	DIODE	1N4148 (TAPPING)	
D902	D1N4148—	DIODE	1N4148 (TAPPING)	
D903	D1N4148—	DIODE	1N4148 (TAPPING)	
D904	D1N4148—	DIODE	1N4148 (TAPPING)	
I901	1TDA6106Q-	IC AMP	TDA6106Q	
I902	1TDA6106Q-	IC AMP	TDA6106Q	
I903	1TDA6106Q-	IC AMP	TDA6106Q	
J182	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
J183	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
J184	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING	
P501A	4850706S12	CONNECTOR	YH025-06+YST025+ULW=300	
P502A	4850705S03	CONNECTOR	YH025-05+YST025+ULW=300	
P906	4859262120	CONN WAFER	YFW800-01	
Q901	TKTA1266Y-	TR	KTA1266Y (TP)	
Q902	TKTC3198Y-	TR	KTC3198Y	
Q903	TKTA1266Y-	TR	KTA1266Y (TP)	
R901	RD-AZ302J-	R CARBON FILM	1/6 3K OHM J	
R902	RD-AZ302J-	R CARBON FILM	1/6 3K OHM J	
R903	RD-AZ302J-	R CARBON FILM	1/6 3K OHM J	
R904	RD-AZ202J-	R CARBON FILM	1/6 2K OHM J	
R905	RD-AZ202J-	R CARBON FILM	1/6 2K OHM J	
R906	RD-AZ202J-	R CARBON FILM	1/6 2K OHM J	
R907	RD-4Z104J-	R CARBON FILM	1/4 100K OHM J	
R908	RD-4Z104J-	R CARBON FILM	1/4 100K OHM J	
R909	RD-4Z104J-	R CARBON FILM	1/4 100K OHM J	
R910	RC-2Z152K-	R CARBON COMP	1/2 1.5K OHM K	
R911	RC-2Z152K-	R CARBON COMP	1/2 1.5K OHM K	
R912	RC-2Z152K-	R CARBON COMP	1/2 1.5K OHM K	
R913	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J	
R914	RD-AZ152J-	R CARBON FILM	1/6 1.5K OHM J	
R915	RD-AZ753J-	R CARBON FILM	1/6 75K OHM J	
R916	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J	
SCT1	4859303030	SOCKET CRT	ISMM03S	

■CP-490 Each Model Difference Parts List

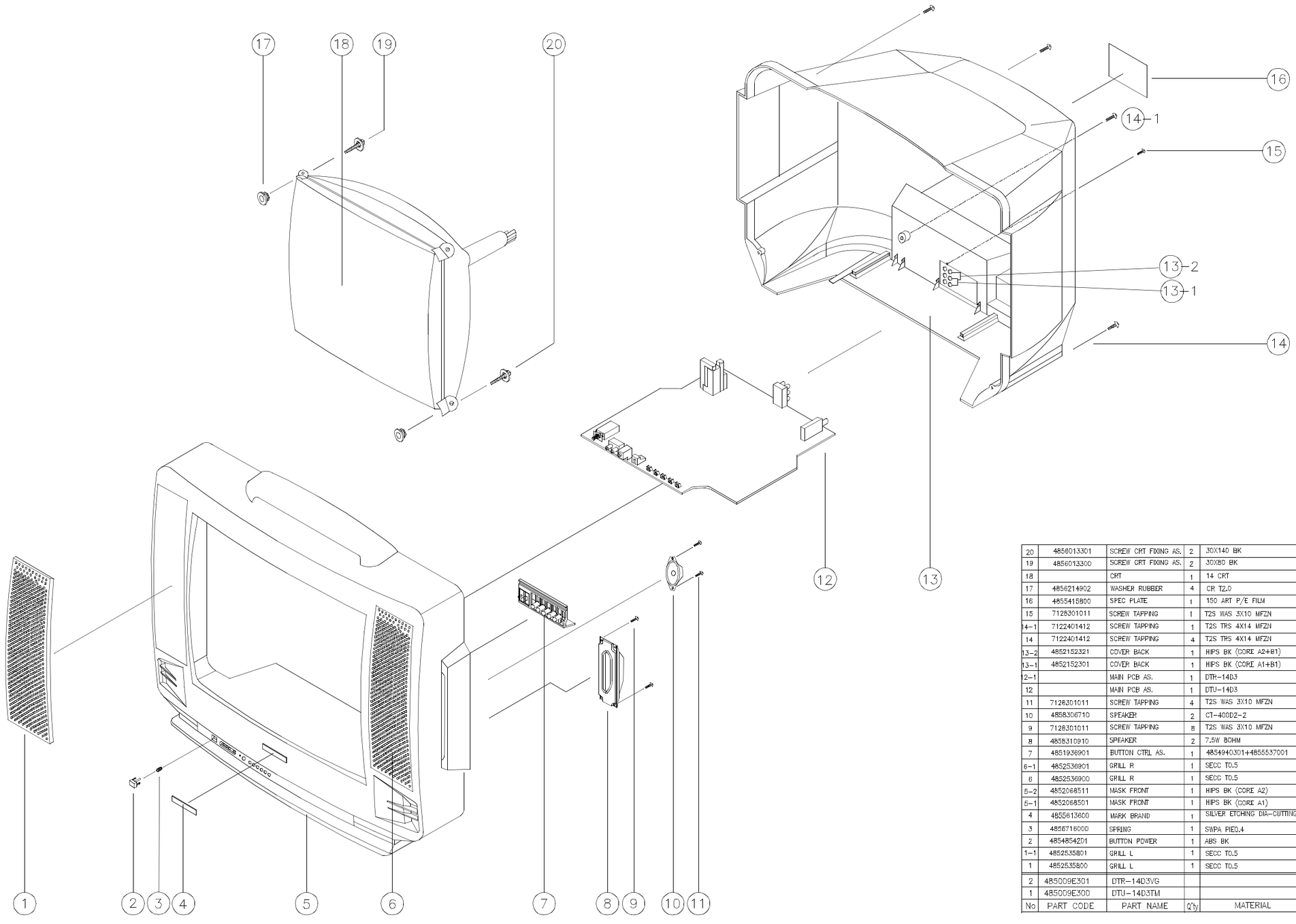
No	LOC.	PART NAME	DTR-14D3VG	DTR-14D3TM	DTR-20D3VG	DTR-20D3TM	DTR-21D3VG	DTR-21D3TM	DTR-21D3VGM	DTR-21D3TMW
1	C722	C CERA	50V B 120PF K CCZB1H121K	50V SL 39PF J CZSL1H390J	50V B 120PF K CCZB1H121K	50V SL 39PF J CZSL1H390J	50V B 120PF K CCZB1H121K	50V SL 39PF J CZSL1H390J	50V B 120PF K CCZB1H121K	50V SL 39PF J CZSL1H390J
2	C723	C CERA	50V B 75PF K CCZB1H750K	50V SL 36PF J CZSL1H360J	50V B 75PF K CCZB1H750K	50V SL 36PF J CZSL1H360J	50V B 75PF K CCZB1H750K	50V SL 36PF J CZSL1H360J	50V B 75PF K CCZB1H750K	50V SL 36PF J CZSL1H360J
3	D720	DIODE	1N4148(TAPPING) D1N4148—-	NONE	1N4148(TAPPING) D1N4148—-	NONE	1N4148(TAPPING) D1N4148—-	NONE	1N4148(TAPPING) D1N4148—-	NONE
4	D830	DIODEZENER	NONE	NONE	NONE	NONE	MTZJ 10C(TAPPING) DMTZJ10C—	⟹	⟹	⟹
5	J180	WIRECOPPER	AWG22 1/0.65 TIN COATING 85801065GY	⟹	⟹	⟹	NONE	NONE	NONE	NONE
6	J094	WIRECOPPER	AWG22 1/0.65 TIN COATING 85801065GY	⟹	⟹	⟹	NONE	NONE	NONE	NONE
7	J095	WIRECOPPER	NONE	NONE	NONE	NONE	AWG22 1/0.65 TIN COATING 85801065GY	⟹	⟹	⟹
8	R302	R METALFILM	1/6 1.5K OHM F RN-AZ1501F	⟹	1/6 1.8K OHM F RN-AZ1801F	⟹	1/6 2.2K OHM F RN-AZ2201F	⟹	⟹	⟹
9	R407	R METALFILM	1/6 7.5K OHM J RD-AZ752J-	⟹	1/6 5.6K OHM J RD-AZ562J-	⟹	⟹	⟹	⟹	⟹
10	R415	R M-OXIDE FILM	2W 2.0•ÿ RS02Z209JS	⟹	2W 3.0•ÿ RS02Z309JS	⟹	2W 1.5•ÿ RS02Z159JS	⟹	⟹	⟹
11	R682	“R METALFILM”	1/6 680.0 OHM F RN-AZ6800F	⟹	1/6 820.0 OHM F RN-AZ8200F	⟹	1/6 1.8K OHM F RN-AZ1801F	⟹	⟹	⟹
12	R699	“R CARBONFILM”	1/6 10K OHM J RD-AZ103J-	NONE	1/6 10K OHM J RD-AZ103J-	NONE	1/6 10K OHM J RD-AZ103J-	NONE	1/6 10K OHM J RD-AZ103J-	NONE
13	R684	“R METALFILM”	1/6 680.0 OHM F RN-AZ6800F	⟹	1/6 820.0 OHM F RN-AZ8200F	⟹	1/6 1.8K OHM F RN-AZ1801F	⟹	⟹	⟹

No	LOC.	PART NAME	DTR-14D3VG	DTR-14D3TM	DTR-20D3VG	DTR-20D3TM	DTR-21D3VG	DTR-21D3TM	DTR-21D3VGM	DTR-21D3TMW
14	R783	R CARBONFILM	1/6 10K OHM J RD-AZ103J-	NONE	1/6 10K OHM J RD-AZ103J-	NONE	1/6 10K OHM J RD-AZ103J-	NONE	1/6 10K OHM J RD-AZ103J-	NONE
15	P603	CONNWAFER	NONE	NONE	NONE	NONE	NONE	NONE	YW025-03 (STICK) 485923162S	YW025-03 (STICK) 485923162S
16	C410	C MYLAR	1.6KV BUP 6900PF J CMYH3C692J	═══▶	1.6KV BUP 7500PF J CMYH3C752J	═══▶	1.6KV BUP 6000PF J CMYH3C602J	═══▶	═══▶	═══▶
17	C411	C MYLAR	200V PU 0.33MF J CMYE2D334J	═══▶	200V PU 0.36MF J CMYE2D364J	═══▶	200V PU 0.3MF J CMYE2D304J	═══▶	═══▶	═══▶
18	I603	IC	NONE	NONE	NONE	NONE	NONE	NONE	UPC 1406HA 1UPC1406HA	UPC 1406HA 1UPC1406HA
19	I605	IC AMP	NONE	NONE	NONE	NONE	NONE	NONE	KA4558 1KA4558—-	KA4558 1KA4558—-
20	I701	IC MICOM	Z9024106PSC 1Z9024106P	DW5255MB1 1DW5255MB1	Z9024106PSC 1Z9024106P	DW5255MB1 1DW5255MB1	Z9024106PSC 1Z9024106P	DW5255MB1 1DW5255MB1	Z9024106PSC 1Z9024106P	DW5255MB1 1DW5255MB1
21	I808	IC Error AMP	SE125N 1SE125N—-	═══▶	═══▶	═══▶	SE103N 1SE103N—	═══▶	═══▶	═══▶
22	P501A	CONNECTOR	YH025-06+YST025 +ULW=300 4850706S12	═══▶	═══▶	═══▶	YH025-06+YST025 +ULW=400 4850706S02	═══▶	═══▶	═══▶
23	P502A	CONNECTOR	YH025-05+YST025 +ULW=300 4850705S03	═══▶	YH025-05+YST025 +ULW=400 4850705S04	═══▶	═══▶	═══▶	═══▶	═══▶
24	PA601	CONNECTOR	YH025-04+35098 +ULW=300 4850704S25	═══▶	═══▶	═══▶	NONE	NONE	NONE	NONE
25	PA602	CONNECTOR	YH025-03+35098 +ULW=600 4850703S54	═══▶	YH025-03+35098 +ULW=700 4850703S55	═══▶	NONE	NONE	NONE	NONE
26	P401	CONNWAFER	YFW500-05 4859240020	═══▶	═══▶	═══▶	YFW500-06 4859240120	═══▶	═══▶	═══▶

No	LOC.	PART NAME	DTR-14D3VG	DTR-14D3TM	DTR-20D3VG	DTR-20D3TM	DTR-21D3VG	DTR-21D3TM	DTR-21D3VGM	DTR-21D3TMW
27	P602	CONNWAFER	YW025-03(STICK) 485923162S	⟹	⟹	⟹	NONE	NONE	NONE	NONE
28	W01	WIRELEAD 1007	AWG22 1/0.65 BK5-170-5 WP-1BK1715	NONE	AWG22 1/0.65 BK5-170-5 WP-1BK1715	NONE	AWG22 1/0.65 BK5-170-5 WP-1BK1715	NONE	AWG22 1/0.65 BK5-170-5 WP-1BK1715	NONE
29	X701	X-TAL 5XE6R0000C	HC-49/U 6.000MHz20PP 5XE18R000E	HC-49/U 18.000MHz30PP 5XE6R0000C	HC-49/U 6.000MHz20PP 5XE18R000E	HC-49/U 18.000MHz30PP 5XE6R0000C	HC-49/U 6.000MHz20PP 5XE18R000E	HC-49/U 18.000MHz30PP 5XE6R0000C	HC-49/U 6.000MHz20PP 5XE18R000E	HC-49/U 18.000MHz30PP
30	SP01	WOOFERSYSTEM	NONE	NONE	NONE	NONE	NONE	NONE	SS-80A0310W 8 OHM 48A8305100	SS-80A0310W 8 OHM 48A8305100
31	SP02	SPEAKERSYSTEM	SS-5090F01 7.5W 4 OHM 48A8305400	⟹	⟹	⟹	SS-58126F02 12W 8 OHM 48A8305000	⟹	⟹	⟹
32	ZZ131	COILDEGAUSSING	DC-1450 58G0000084	⟹	DC-2050 58G0000086	⟹	DC-2070 58G0000074	⟹	⟹	⟹
33	ZZ132	CRT GROUNDNET	1401H-1015-1P 48519A4610	⟹	2001H-1015-1P 48519A5010	⟹	2101H-1015-1P 48519A5210	⟹	⟹	⟹
34	ZZ100	TRANSMITTER REMOCON	R-28B04 48B3228B04	R-28B03 48B3228B03	R-28B04 48B3228B04	R-28B03 48B3228B03	R-28B04 48B3228B04	R-28B03 48B3228B03	R-28B04 48B3228B04	R-28B03 48B3228B03
35	V01	COIL DY	ODY-M1401 58D1000046	⟹	ODY-M2002 58D1000045	⟹	ODY-F2102(L) 58D0000074	⟹	⟹	⟹
36	V901	CRT BARE	A34JLL90X 48A96414P1	⟹	A48JLL90X(W) 48A96420P1	⟹	A51JSW90X 48A96321P1	⟹	⟹	⟹

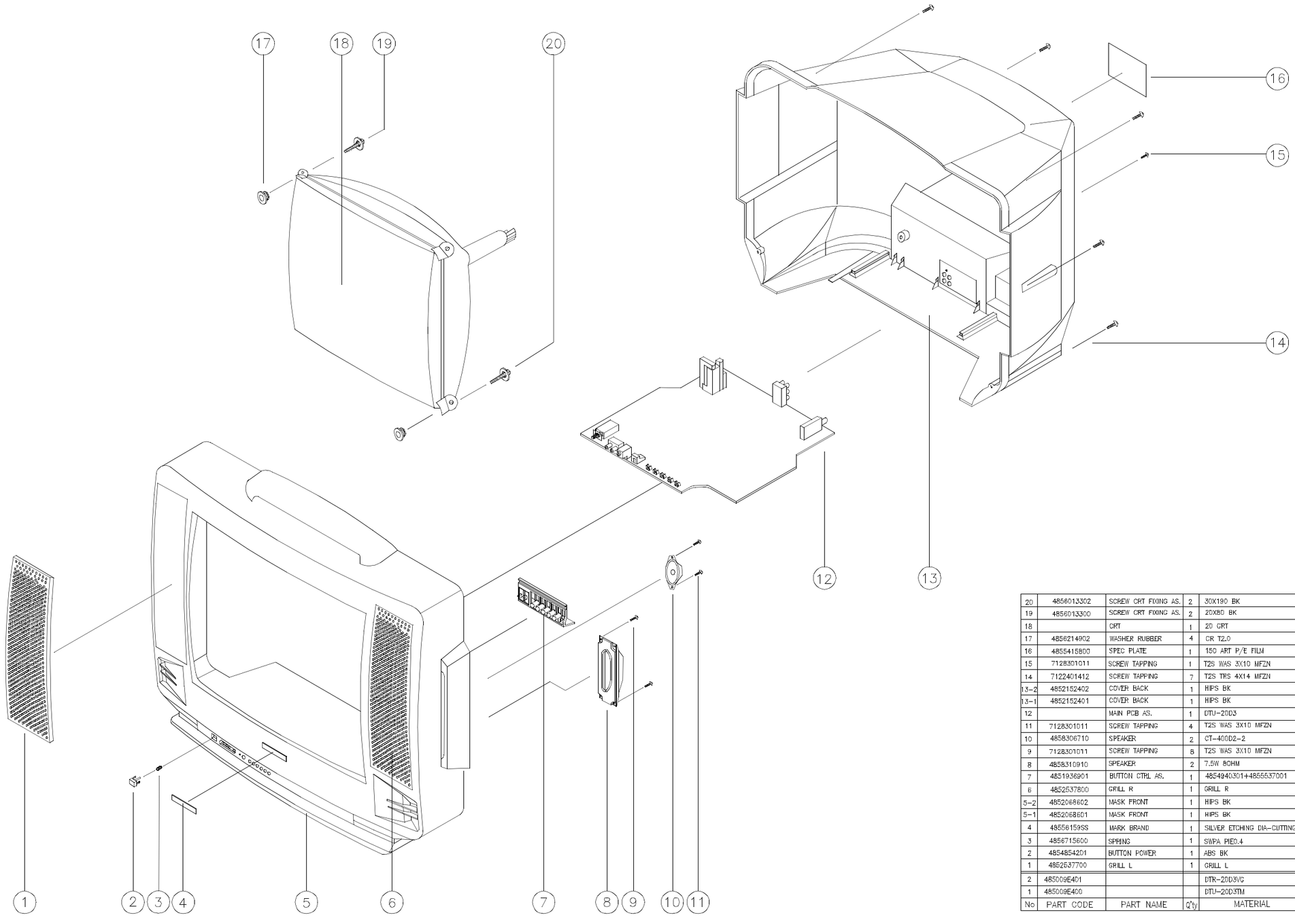
■ Mechanical Exploded View

1. 14D3



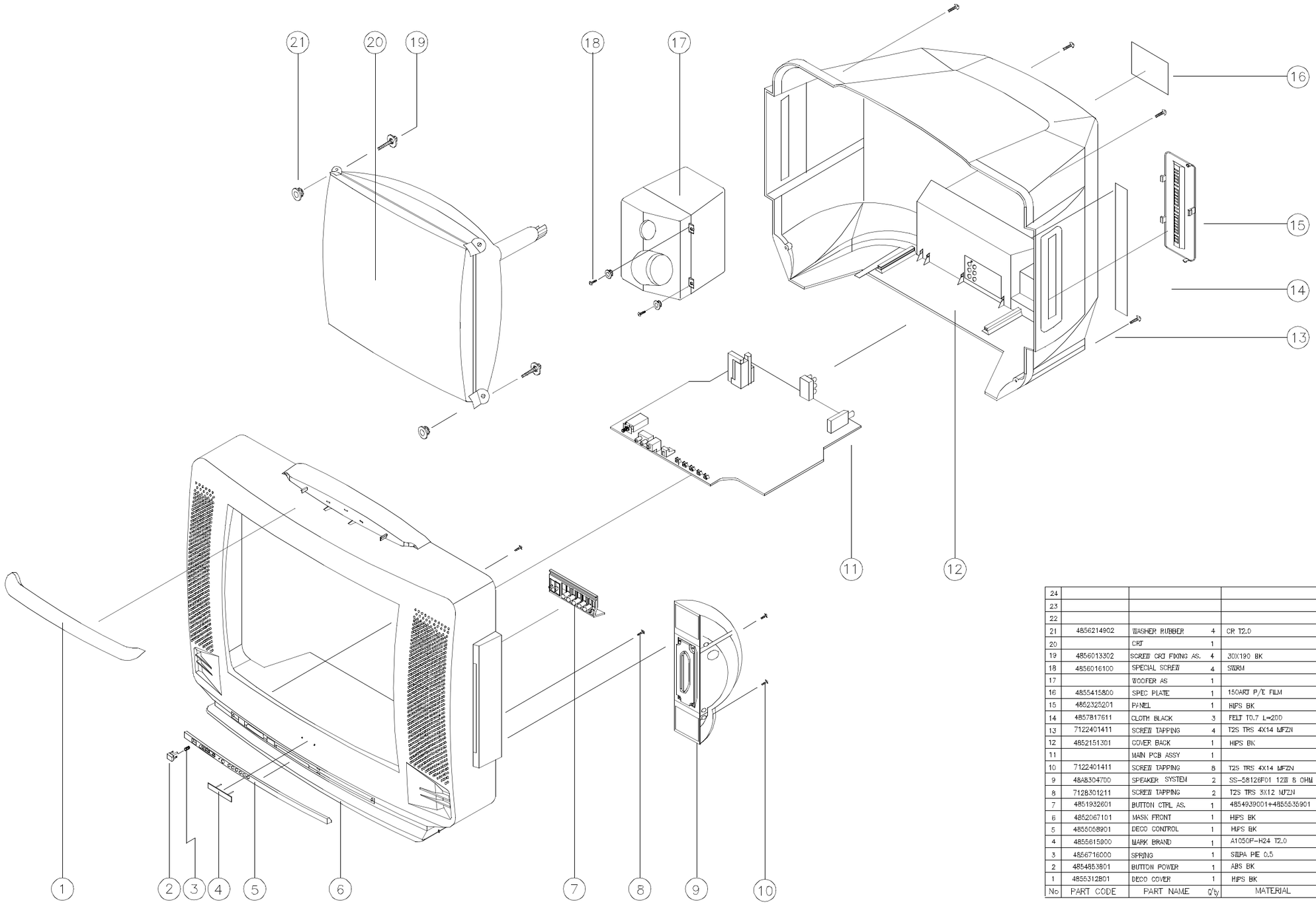
20	4856013301	SCREW CRT FIXING AS.	2	30X140 BK	
19	4856013300	SCREW CRT FIXING AS.	2	30X80 BK	
18		CRT	1	14 CRT	
17	4856214902	WASHER RUBBER	4	CR TZ.0	
16	4855415800	SPEC PLATE	1	150 ART P/E FILM	
15	7126301011	SCREW TAPPING	1	T2S WAS 3X10 MFZN	Cp-490
14-1	7122401412	SCREW TAPPING	1	T2S TRS 4X14 MFZN	
14	7122401412	SCREW TAPPING	4	T2S TRS 4X14 MFZN	
13-2	4852152321	COVER BACK	1	HIPS BK (CORE A2+B1)	Cp-490
13-1	4852152301	COVER BACK	1	HIPS BK (CORE A1+B1)	Cp-371
12-1		MAIN PCB AS.	1	DTR-14D3	Cp-490
12		MAIN PCB AS.	1	DTU-14D3	Cp-371
11	7126301011	SCREW TAPPING	4	T2S WAS 3X10 MFZN	
10	4858306710	SPEAKER	2	CT-400D2-2	
9	7126301011	SCREW TAPPING	8	T2S WAS 3X10 MFZN	
8	4858310910	SPEAKER	2	7.5W 8OHM	
7	4851936901	BUTTON CTRL AS.	1	4854940301+4855537001	
6-1	4852536901	GRILL R	1	SECC T0.5	MACHINE ASS'Y
6	4852536900	GRILL R	1	SECC T0.5	HAND ASS'Y
5-2	4852068511	MASK FRONT	1	HIPS BK (CORE A2)	Cp-490
5-1	4852068501	MASK FRONT	1	HIPS BK (CORE A1)	Cp-371
4	4855613600	MARK BRAND	1	SILVER ETCHING DIA-CUTTING	
3	4856716000	SPRING	1	SWPA PIE0.4	
2	48548542D1	BUTTON POWER	1	ABS BK	
1-1	4852535801	GRILL L	1	SECC T0.5	MACHINE ASS'Y
1	4852535800	GRILL L	1	SECC T0.5	HAND ASS'Y
2	485009E301	DTR-14D3VG			Cp-490
1	485009E300	DTU-14D3TM			Cp-371
No	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS

2. 20D3



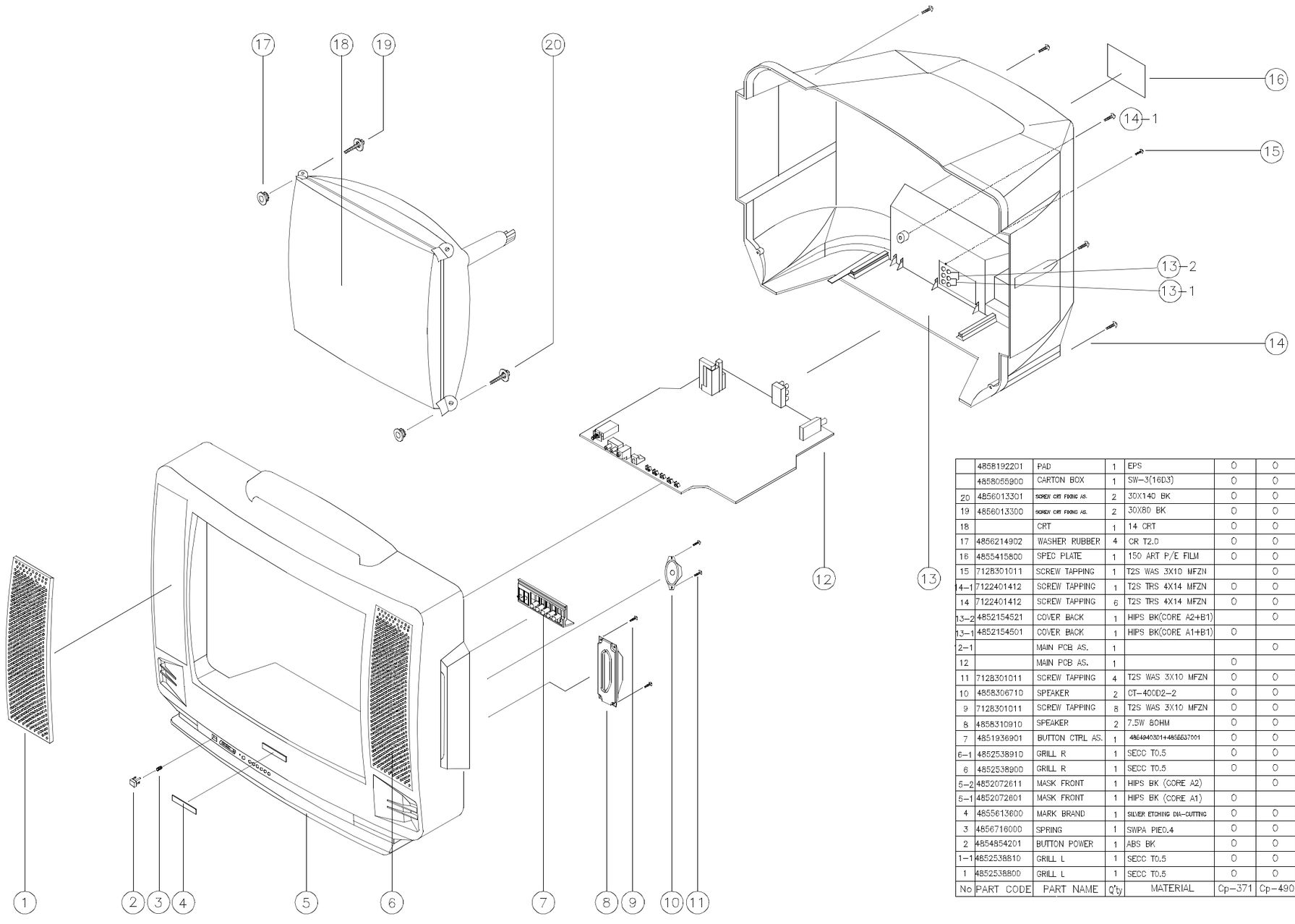
No	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS
20	4856013302	SCREW CRT FIXING AS.	2	30X190 BK	
19	4856013300	SCREW CRT FIXING AS.	2	20X80 BK	
18		CRT	1	20 CRT	
17	4856214902	WASHER RUBBER	4	CR T2.0	
16	4855415800	SPEC PLATE	1	150 ART P/E FILM	
15	7128301011	SCREW TAPPING	1	T2S WAS 3X10 MFZN	
14	7122401412	SCREW TAPPING	7	T2S TRS 4X14 MFZN	
13-2	4852152402	COVER BACK	1	HIPS BK	Cp-490
13-1	4852152401	COVER BACK	1	HIPS BK	Cp-371
12		MAIN PCB AS.	1	DTU-20D3	
11	7128301011	SCREW TAPPING	4	T2S WAS 3X10 MFZN	
10	4858306710	SPEAKER	2	CT-400D2-2	
9	7128301011	SCREW TAPPING	8	T2S WAS 3X10 MFZN	
8	4858310910	SPEAKER	2	7.5W 8OHM	
7	4851936901	BUTTON CTRL AS.	1	4854940301+4855537001	
6	4852537800	GRILL R	1	GRILL R	
5-2	4852068602	MASK FRONT	1	HIPS BK	Cp-490
5-1	4852068601	MASK FRONT	1	HIPS BK	Cp-371
4	4855615955	MARK BRAND	1	SILVER ETCHING DIA-CUTTING	
3	4856715600	SPRING	1	SWPA PIE0.4	
2	4854854201	BUTTON POWER	1	ABS BK	
1	4852537700	GRILL L	1	GRILL L	
2	485009E401			DTR-20D3VG	Cp-490
1	485009E400			DTU-20D3TM	Cp-371

3. 21D3



24					
23					
22					
21	4856214902	WASHER RUBBER	4	CR T2.0	
20		CRT	1		
19	4856013302	SCREW CRT FIXING AS.	4	30X190 BK	
18	4856016100	SPECIAL SCREW	4	SWRM	
17		WOOFER AS	1		
16	4855415800	SPEC PLATE	1	150ART P/E FILM	
15	4852325201	PANEL	1	HIPS BK	
14	4857817611	CLOTH BLACK	3	FELT T0.7 L=200	
13	7122401411	SCREW TAPPING	4	T2S TRS 4X14 MFZN	
12	4852151301	COVER BACK	1	HIPS BK	
11		MAIN PCB ASSY	1		
10	7122401411	SCREW TAPPING	8	T2S TRS 4X14 MFZN	
9	48AB304700	SPEAKER SYSTEM	2	SS-58126F01 12W 8 OHM	
8	7128301211	SCREW TAPPING	2	T2S TRS 3X12 MFZN	
7	4851932601	BUTTON CTRL AS.	1	4854939001+4855535901	
6	4852067101	MASK FRONT	1	HIPS BK	
5	4855068901	DECO CONTROL	1	HIPS BK	
4	4855615900	MARK BRAND	1	A1050F-H24 T2.0	
3	4856716000	SPRING	1	SWPA PIE 0.5	
2	4854853801	BUTTON POWER	1	ABS BK	
1	4855312B01	DECO COVER	1	HIPS BK	
No	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS

4. 16D3

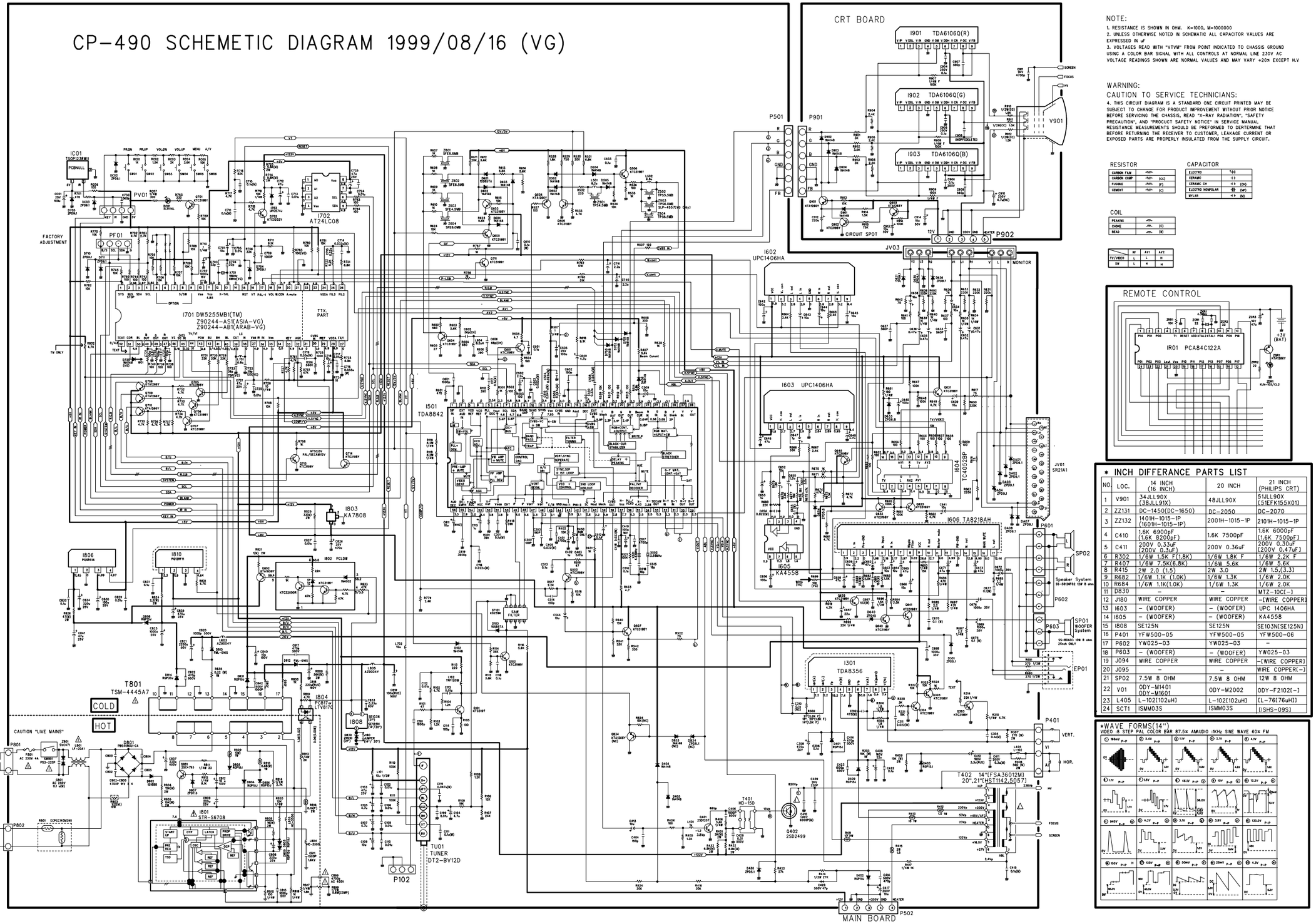


	4858192201	PAD	1	EPS	O	O	
	4858055900	CARTON BOX	1	SW-3(16D3)	O	O	
20	4856013301	SCREW CRT FIXING AS.	2	30X140 BK	O	O	
19	4856013300	SCREW CRT FIXING AS.	2	30X80 BK	O	O	
18		CRT	1	14 CRT	O	O	
17	4856214902	WASHER RUBBER	4	CR T2.0	O	O	
16	4855415800	SPEC PLATE	1	150 ART P/E FILM	O	O	
15	7128301011	SCREW TAPPING	1	T2S WAS 3X10 MFZN		O	
4-1	7122401412	SCREW TAPPING	1	T2S TRS 4X14 MFZN	O	O	
14	7122401412	SCREW TAPPING	6	T2S TRS 4X14 MFZN	O	O	
13-2	4852154521	COVER BACK	1	HIPS BK(CORE A2+B1)		O	
13-1	4852154501	COVER BACK	1	HIPS BK(CORE A1+B1)	O		
2-1		MAIN PCB AS.	1			O	
12		MAIN PCB AS.	1		O		
11	7128301011	SCREW TAPPING	4	T2S WAS 3X10 MFZN	O	O	
10	4858306710	SPEAKER	2	OT-400D2-2	O	O	
9	7128301011	SCREW TAPPING	8	T2S WAS 3X10 MFZN	O	O	
8	4858310910	SPEAKER	2	7.5W 8OHM	O	O	
7	4851936901	BUTTON CTRL AS.	1	4864040301+4856537001	O	O	
6-1	4852538910	GRILL R	1	SECC T0.5	O	O	MACHINE ASS'Y (HOT PRESS)
6	4852538900	GRILL R	1	SECC T0.5	O	O	HAND ASS'Y
5-2	4852072611	MASK FRONT	1	HIPS BK (CORE A2)		O	
5-1	4852072601	MASK FRONT	1	HIPS BK (CORE A1)	O		
4	4855613600	MARK BRAND	1	SILVER ETCHING DIA-CUTTING	O	O	
3	4856716000	SPRING	1	SWPA PIE0.4	O	O	
2	4854854201	BUTTON POWER	1	ABS BK	O	O	
1-1	4852538810	GRILL L	1	SECC T0.5	O	O	MACHINE ASS'Y (HOT PRESS)
1	4852538800	GRILL L	1	SECC T0.5	O	O	HAND ASS'Y
No	PART CODE	PART NAME	Q'ty	MATERIAL	Cp-371	Cp-490	REMARKS

■ Printed Circuit Boards

■Circuit Schematics

CP-490 SCHEMATIC DIAGRAM



NOTE:

1. RESISTANCE IS SHOWN IN OHM. K=1000, M=1000000
2. UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITOR VALUES ARE EXPRESSED IN uF
3. VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND USING A COLOR BAR SIGNAL WITH ALL CONTROLS AT NORMAL LINE 230V AC VOLTAGE READINGS SHOWN ARE NORMAL VALUES AND MAY VARY +20% EXCEPT H.V

WARNING:

CAUTION TO SERVICE TECHNICIANS:

4. THIS CIRCUIT DIAGRAM IS A STANDARD ONE CIRCUIT PRINTED MAY BE SUBJECT TO CHANGE FOR PRODUCT IMPROVEMENT WITHOUT PRIOR NOTICE BEFORE SERVICING THE CHASSIS, READ "X-RAY RADIATION", "SAFETY PRECAUTION", AND "PROCUCT SAFETY NOTICE" IN SERVICE MANUAL RESISTANCE MEASUREMENTS SHOULD BE PREFORMED TO DERTERMINE THAT BEFORE RETURNING THE RECEIVER TO CUSTOMER, LEAKAGE CURRENT OR EXPOSED PARTS ARE PROPERLY INSULATED FROM THE SUPPLY CIRCUIT.

RESISTOR

CARBON FILM	~	
CARBON COMP	~	(CC)
FUSIBLE	~	(F)
CEMENT	~	(C)

CAPACITOR

ELECTRO	~	(E)
CERAMIC	+|	
CERAMIC CH	+|	(CH)
ELECTRO NONPOLAR	+|	(NP)
MYLAR	+|	(M)

COIL

PEAKING	~
CHOKE	~ (C)
BEAD	~ (B)

	RF	AV1	AV2
TV/VIDEO	L	L	H
SW	L	H	H

* INCH DIFFERANCE PARTS LIST

NO.	LOC.	14 INCH (16 INCH)	20 INCH	21 INCH (PHILIPS CRT)
1	V901	34JLL90X (38JLL91X)	48JLL90X	51JLL90X (51EFK155X01)
2	ZZ131	DC-1450(DC-1650)	DC-2050	DC-2070
3	ZZ132	1401H-1015-1P (1601H-1015-1P)	2001H-1015-1P	2101H-1015-1P
4	C410	1.6K 6900pF (1.6K 8200pF)	1.6K 7500pF	1.6K 6000pF (1.6K 7500pF)
5	C411	200V 0.33uF (200V 0.3uF)	200V 0.36uF	200V 0.30uF (200V 0.47uF)
6	R302	1/6W 1.5K F(1.8K)	1/6W 1.8K F	1/6W 2.2K F
7	R407	1/6W 7.5K(6.8K)	1/6W 5.6K	1/6W 5.6K
8	R415	2W 2.0 (1.5)	2W 3.0	2W 1.5(3.3)
9	R682	1/6W 1.1K (1.0K)	1/6W 1.3K	1/6W 2.0K
10	R684	1/6W 1.1K(1.0K)	1/6W 1.3K	1/6W 2.0K
11	D830	–	–	MTZ-10C(-)
12	J180	WIRE COPPER	WIRE COPPER	-(WIRE COPPER)
13	I603	– (WOOFER)	– (WOOFER)	UPC 1406HA
14	I605	– (WOOFER)	– (WOOFER)	KA4558
15	I808	SE125N	SE125N	SE103N(SE125N)
16	P401	YFW500-05	YFW500-05	YFW500-06
17	P602	YW025-03	YW025-03	–
18	P603	– (WOOFER)	– (WOOFER)	YW025-03
19	J094	WIRE COPPER	WIRE COPPER	-(WIRE COPPER)
20	J095	–	–	WIRE COPPER(-)
21	SP02	7.5W 8 OHM	7.5W 8 OHM	12W 8 OHM
22	V01	ODY-M1401 ODY-M1601	ODY-M2002	ODY-F2102(-)
23	L405	L-102(102uH)	L-102(102uH)	(L-76(76uH))
24	SCT1	ISMM03S	ISMM03S	(ISHS-09S)

*WAVE FORMS(14")

VIDEO :8 STEP PAL COLOR BAR 87.5% AMMUDIO :1KHz SINE WAVE 60% FM

ENGINEER NOTE

DAEWOO

DAEWOO ELECTRONICS CO., LTD.
686, AHYEON-DONG, MAPO-GU,
SEOUL, KOREA.
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